

Climate Change Program Annual Report, 2016



California Department of Water Resources

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CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Adaptation Planning in IWM

Sponsor/Program Manager

John Andrew

Project Manager

John Andrew

Project Status:

Project Initiation Only

Project Objective:

Build and strengthen DWR's institutional capacity for incorporating climate change adaptation planning and strategies within IWM.

Project Description:

The successful implementation of integrated water management relies on the coordination and integration between programs within Integrated Water Management (IWM). Greater coordination between the Climate Change Program and the divisions is needed to promote climate change adaptation planning in the numerous programs and projects underway in DFM, DSD, DSIWM, and DIRWM.

This project will help identify programs, within IWM, that would benefit from additional support from the Climate Change Program and those programs that in turn could provide additional support to the Climate Change Program; develop topic-specific guidance to assist programs/projects to integrate adaptation strategies and; improve coordination and communication between IWM Divisions.

Project Deliverables/Timeline

Undetermined as of 8/31/16

Success Determination - Performance Metrics**Customers:****Funding Information:**

Project Budget (Total):		Funding Source:	
Budget Notes:			
Project Start Date:		Project End Date:	

External Partners:

All divisions in IWM (DFM, DSD, DSIWM, DIRWM)

2016 Project Accomplishments

Annual Reporting Category before 2015

N/A

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O III: Integrate Climate Change into DWR’s Programs and Activities

IWM Business Categories

N/A

State Water Project Related? No

Governor's Water Action Plan

N/A

Safeguarding California Implementation Plan

N/A

Legislative and Gubernatorial Mandates

N/A

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Agriculture Mitigation and Stewardship

Sponsor/Program Manager	Elissa Lynn, John Andrew, Kent Frame
Project Manager	Jennifer Morales

Project Status:

On Going

Project Objective:

Resiliency building and GHG emission reduction in the agricultural sector through the implementation of AB 32: California's Global Warming Solutions Act.

Project Description:

California produces nearly half of all US grown fruits, nuts and vegetables yet has been slow to adopt progressive water and energy stewardship practices. Practices such as on-farm water storage, healthy soils, on-farm anaerobic digesters, no till/low till cropping, and increased irrigation efficiency can reduce GHG emissions through carbon sequestration, reduced energy use, and water use conservation and efficiency. This can be done by partnering with agencies with related goals to leverage resources, incentivize stewardship through grant programs, and by creating an aggressive education campaign for the public, academia, and the agricultural industry.

Project Deliverables/Timeline

Climate Menu poster I (2015)
Climate Change Handbook for Agricultural Water Suppliers (2017)
Climate Menu poster II (2017)

Success Determination - Performance Metrics

At least four of the five tasks should be accomplished annually:

- a) climate change mitigation grant review
- b) collaboration on mitigation program
- c) creation of outreach mitigation materials
- d) completed a climate change mitigation presentation
- e) produced a climate change mitigation research paper, guidebook, or other stakeholder assistance document

Customers:

Irrigation/ Water Districts, Academic Institutions, NGO's, and the public at large.

Funding Information:

Project Budget (Annual):	\$125,000	Funding Source:	AB 32
Budget Notes:	Listed budget represents a portion of the total funding already indicated under the project "Mitigation Team".		
Project Start Date:	May 2011	Project End Date:	On-going

External Partners:

WUE Branch, IRWM, UC Co-op, CASI, CalCAN, CDFA, CDFW, Cal Poly Pomona/ITRC, USDA Climate Sub-Hub

2016 Project Accomplishments

Work continued on the AB 32 Scoping Plan update, along with staff from CNRA, CARB, CDFA, and others. The deadline has been pushed to summer 2017. The Scoping Plan sets the focus for investments in climate change mitigation and planning for California. For the first time ever, the Scoping Plan will include an economic analysis as well as GHG quantification and accounting.

CDWR worked with CDFA to implement the 2016 round of SWEEP (State Water Efficiency and Enhancement Program) Funding, as well as the launch of the Healthy Soils Program. These programs target agricultural water and energy use efficiency and GHG mitigation by offering financial assistance to install new or upgraded irrigation equipment, and build soil health.

Water-energy grant review was completed along with the CDWR Water Use Efficiency Branch. The 2016 Water-Energy Grant Program Proposal Solicitation made up to \$19 million available for commercial and institutional water-energy efficiency projects or programs, and residential water-energy efficiency projects or programs benefiting DACs. The solicitation identified 14 priority projects, and is proposing additional funds for project monitoring for effectiveness.

Stakeholder outreach was again a high priority this year, with presentations being provided at the College of the Sequoias, Ag at the Cap, Tulare Office of Education, the Tulare Basin Watershed Connections Workgroup, and the Environmental Scientist Workshop.

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O III: Integrate Climate Change into DWR's Programs and Activities
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research
- O VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
 Building Capacity for Regional Sustainability
 Taking Action to Reduce Residual Risk
 Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life
 Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
 Achieve the Co -Equal Goals for the Delta
 Protect and Restore Important Ecosystems
 Manage and Prepare for Dry Periods
 Expand Water Storage Capacity and Improve Groundwater Management
 Provide Safe Water for All Communities

Safeguarding California Implementation Plan

Diversify Local Supplies and Increase Water Use Efficiency Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources Continue to Mainstream Climate Considerations into Water Management Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks N/A
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Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Atmospheric Rivers and Climate Change

Sponsor/Program Manager	DWR
Project Manager	Michael L Anderson / Jeanine Jones

Project Status:

On Going

Project Objective:

Characterize atmospheric rivers as they pertain to benefit to water supply and flood hazard
Examine past, present, and future characteristics of atmospheric rivers and their change with climate change
Develop decision support services for forecasting and planning in water management as they relate to atmospheric rivers and precipitation and runoff

Project Description:

Better monitoring and prediction of atmospheric river events (AREs) has the potential to add flexibility to water management efforts in California. This project aims to increase our understanding of the role of AREs in the development of annual water supply and their role in flood events and how they might change with climate change.

Project Deliverables/Timeline

Workshops, decision support material, studies and projects with a goal to improve extreme precipitation prediction

Success Determination - Performance Metrics

Release of publications and decision support products for water supply managers. Outreach materials on Atmospheric Rivers for the public, forecasters, researchers and decision makers.

Customers:

DWR Flood Management and Climate Change as well as broader public

Funding Information:

Project Budget (Annual):	\$3,000,000	Funding Source:	General Fund/Prop 84
Budget Notes:	UCOP Climate Services Agreement is contract 46-10378. AR work is \$3 million for work in 2015. An additional \$3 million was provided by budget act for fiscal year 2017.		
Project Start Date:	2014	Project End Date:	2019

External Partners:

SIO/CW3E/University of California Campuses as specified by task order/NOAA ESRL

2016 Project Accomplishments

See 4 quarterly project updates from Scripps, and climatology schematic, attached.

Annual Reporting Category before 2015

N/A

Climate Change Objectives

O I. Develop and Improve Communication, Outreach and Education on Climate Change
O III: Integrate Climate Change into DWR's Programs and Activities
O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Managing Floodwaters while Protecting the Ecosystem
Taking Action to Reduce Residual Risk

State Water Project Related?

Yes

Governor's Water Action Plan

Manage and Prepare for Dry Periods
Increase Flood Protection

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure

Quarter 1 Update
January-March 2016

DWR 1: Addressing California's Future Flood Risks Associated with Atmospheric Rivers (ARs)

Decision Support Tools

- Marty Ralph and Sam Iacobellis quantified ARs integrate vapor transport (IVT) offshore using data from aircraft. Using this aircraft data to quantify the full IVT will help to develop a threat level for local communities. Ralph et al. (submitted) quantifies offshore total IVT (average $4.31 \pm 1.69 \times 10^8$ Kg/s) and width (average 861 ± 260 km) of ARs from field experiments
- We developed rainfall Category, "RCat", alerts. The alerts are automated e-mail notification service that informs users of heavy precipitation events in near real-time.
<http://cw3e.ucsd.edu/?p=4991>
- Marty Ralph and Jay Codeira evaluated correspondence between extreme precipitation events as defined by the Northern Sierra 8-station Index and the presence of the Sierra Barrier Jet to better understand the meteorological conditions that lead to extreme precipitation which impacts water supply and flooding risk.
 - Paper accepted with minor revisions: Ralph, F. M., J. M. Cordeira, P. J. Neiman, M. Hughes, Landfalling Atmospheric Rivers, the Sierra Barrier Jet and Extreme Daily Precipitation in Northern California's Upper Sacramento River Watershed, *Journal of Hydrometeorology*
 - 92% of Extreme daily precipitation were associated with ARs
 - 90% of Extreme daily precipitation were associated with the Sierra Barrier Jet
 - 82% of Extreme daily precipitation were associated with both ARs and the Sierra Barrier Jet

Landslide and alluvial fan flooding

- Allison Young and Jay Cordeira compared reanalysis data to a landslide catalogue (courtesy of John Stock, USGS) from the Bay Area from 1871 to 2012 to understand how meteorological conditions can potentially lead to landslides. The results show that landslides occur when there are winds blowing from the Pacific Ocean toward California and has an IVT of 250 kg/m/s offshore and values of >150 kg/m/s along the coast. This research will eventually be applied to a landslide warning tool.

Coastal California Storm Surge

- We characterized the high water extremes, including amplitude, how they build and how they decay to eventually be able to better forecast high sea level events.
 - Along the southern California coast, most extreme sea levels occur during peak astronomical tides.
 - Along the northern California coast, extreme sea levels are often not during peak astronomical tides, but rather heavy weather conditions drive the majority of extreme sea level events.

DWR 2: Alluvial Fan Flooding Climatology

- To understand how meteorological conditions impact extreme rainfall in the Transverse Ranges Nina Oakley studied the role of ARs and cut-off lows in controlling rainfall in the region. Nearly all events extreme events (99th percentile one day precipitation totals) fell into one of these categories.
- To study the meteorological conditions that cause post-fire debris flows Jeremy Lancaster and Nina Oakley completed a compilation of PFDF database including 19 storm events and 100 debris flows from 1978 – 2014. Of the 19 storm events, 12 (57%) were ARs, 5 (24%) were both ARs and cut-off lows, 1 (5%) was a closed low, and 3(14%) were neither. Additional meteorological conditions for the storm events were also examined.

DWR 3: Water-Year Outlook Workshop and AR Climatology Advancement

- Alexander Gershunov and Tamara Shulgina developed a novel automated methodology for the detection of atmospheric rivers (ARs) and produced a 68-year catalog of ARs that made landfall at the west coast of North America during 1948-2015 supporting DWR's goal of studying the long term climatology of ARs.
- Alexander Gershunov and Tamara Shulgina performed a preliminary investigation of links to hydroclimate with high-resolution precipitation data. Preliminary results from the hydroclimate analysis of AR landfalls looked at linkages between climate variability expressed in Pacific sea surface temperatures, revealing links to Pacific decadal variability, recent regional anomalies, and long-term ocean warming.

DWR 4: Extreme Precipitation Decision Support Tool Development

- Brian Kawzenuk has aggregated the data from the observing networks online in one location making is easier for users to find and access the data.
http://cw3e.ucsd.edu/precipitation_forecasts/

DWR 1: Addressing California's Future Flood Risks Associated with Atmospheric Rivers (ARs)

Decision Support Tools

- Brian Kawzenuk evaluated GFS forecasts at various lead times to determine AR landfall location and timing errors at Bodega Bay based on the observed landfall time by the AR observing station. This research will provide information for emergency management and other decision makers to understand the uncertainty of the forecasts.

Landslide and alluvial fan flooding

- Julie Kalansky is working with John Stock and Collin Cronkite-Ratcliff at USGS, to analyze EFREP HMT soil moisture data to determine the amount of precipitation necessary to reach certain soil moisture threshold values that may cause new storms to trigger landslides.

Coastal California Storm Surge

- Dan Cayan and Sam Iacobellis characterized the large atmospheric patterns that drive high water extremes. They found that during the 10 highest non-tide winter sea level extremes since 1900 the low pressure system was intensified and in a more southerly location. This may help with forecasting flooding events caused by high sea level.

DWR 2: Alluvial Fan Flooding Climatology

- Nina Oakley with co-authors prepared a technical paper on the meteorological conditions that lead to post-fire debris flows. It is likely to be submitted by the end of summer.
- Using a Landslide catalogue from John Stock (USGS), Nina Oakley looked at 24 landslide events between 1952-2005 and determine that 8 were associate with ARs, 4 were associated with cut-off lows, 10 were associated with both and 2 with associated with neither.

DWR 3: Water-Year Outlook Workshop and AR Climatology Advancement

- Alexander Gershunov with co-authors prepared a technical paper on the automated methodology for the detection of atmospheric rivers to be submitted by the end of the summer.
- Top 10 precipitation events in WY 2016 were determined based on storm total precipitation measured by the Northern Sierra 8-Station Index, for purposes of water supply and flood potential comparison with future climate events.

DWR 4: Extreme Precipitation Decision Support Tool Development

- The google map interface is being developed for the Russian River. Currently it includes precipitation forecasts for sub watersheds in the Russian River and calculates how this will impact reservoir storage.
http://vortex.plymouth.edu/~j_cordeira/WSPortal/WS-Russian.html

DWR 1: Addressing California's Future Flood Risks Associated with Atmospheric Rivers (ARs)

Decision Support Tools

- Brian Kawzenuk continued his evaluation of errors with respect to AR landfall in the GFS and West-WRF. Initial results indicate that both models show comparable skill and have good skill to about six day lead times. Timing and location errors significantly increase forecasts beyond six days. Future work will assess timing and duration of AR conditions, as well as long term comparisons during non-AR periods. This research will provide information for emergency management and other decision makers to understand the uncertainty of the forecasts, especially after 6 days.

Landslide and alluvial fan flooding

- Graduate student, Allison Young finished the total California debris flow and AR analyses that demonstrate that 81.6% of debris flows occur on the day of or the day after a landfalling AR in California. The three County Warning Areas (CWAs) with the highest number of debris flows for the 2005-2014 water years were Monterey, San Diego, and Hanford; these debris flows were associated with landfalling ARs 93.6%, 60.7%, and 82.6% of the time. These three CWAs are currently the focus of a 6-h precipitation data analysis that will illustrate the distributions and thresholds of 6-h precipitation that are associated with debris flows with and without ARs, and inform a debris flow susceptibility mapping.
- Partners at USGS are developing a model that accounts for topographic effects on precipitation patterns. This model takes 15-km precipitation cells from regional climate models (e.g., RegCM3) and forecasts precipitation in mountainous areas at ~1 km or finer cells. This produces high-resolution maps of total precipitation that help us assess when and where California's mountains become susceptible to landsliding and other storm-driven hazards.
- USGS partners are using satellite data (e.g., thermal bands from ASTER) to identify areas of California that are not susceptible to storm-triggered shallow landsliding, and those that are. Statewide maps will focus efforts towards areas that are hazardous.

Coastal California Storm Surge

- Further study of California historical sea level records indicates a rather strong dependence of the occurrence of extreme high sea levels on ENSO state, not only in the sense that the overwhelming number of high extremes during the last several decades have occurred during El Nino years (and very few during La Nina years) but also that their incidence has been quite strongly favored during the strongest El Nino years and only modestly so during weak El Nino years. The historical data also indicate that extreme high sea levels have occurred more often during positive Pacific Decadal Oscillation (PDO) years than negative PDO years, although this linkage is not as strong as with ENSO state. This information could help coastal cities, counties, and the state plan for extreme sea level events on the seasonal time scale.

DWR 2: Alluvial Fan Flooding Climatology

- Nina Oakley with co-authors submitted a technical paper on the meteorological conditions that lead to post-fire debris flows to the journal *Natural Hazards*.
- Nina Oakley and Colleagues are analyzing sub-daily precipitation data from to examine which areas of California most frequently experience precipitation intensities conducive to shallow landslides. This highlights area that most susceptible to landslides due to extreme precipitation events. Currently they are experimenting with different types of map to display this information.
- Jeremy Lancaster, CA Geological Survey, has continues to compile post-fire debris flow events to eventually extend the database used in the previous paper study back to the late 1940's. The extended catalogue will improve understanding of what causes post-fire debris flows and the variability between flow events.

DWR 3: Water-Year Outlook Workshop and AR Climatology Advancement

- Alexander Gershunov and colleagues have continued our analysis of seasonal-interannual landfalling AR activity linked to Pacific sea surface temperature (SST). SST patterns, including those associated with ENSO and PDO emerge as influential with respect to landfalling AR activity. Building on these results, they have developed seasonal predictability model for AR-related IVT and precipitation linked to Pacific SST. Currently they are in the process of assessing and optimizing the seasonal skill of their model to determine if Pacific SST patterns can improve S2S forecasting of ARs.
- The Winter Outlook Workshop was schedule from Nov 16-18, at Scripps Institution of Oceanography.

DWR 4: Extreme Precipitation Decision Support Tool Development

- Continual development of the google map interface for the Russian River. Currently it includes precipitation forecasts for sub watersheds in the Russian River and calculates how this will impact reservoir storage.
http://vortex.plymouth.edu/~j_cordeira/WSPortal/WS-Russian.html

DWR 1: Addressing California's Future Flood Risks Associated with Atmospheric Rivers (ARs)

Decision Support Tools

- B. Kawzenuk presented at AGU forecast verification of days 1---10 of IWV, winds, and water vapor flux using the Bodega Bay ARO observations as verification.
- B. Kawzenuk posted 11 new AR Updates and Outlooks to the CW3E website to highlight incoming ARs and impacts
- S. Iacobellis is Revising journal article on AR dropsonde data for offshore analysis

Landslide and alluvial fan flooding

- C. Cerovski---Darriau, USGS, is preparing a paper on regions where landslides do not occur.
- C. Cronkite---Ratcliff, USGS, presented on AGU about extreme precipitation and probability of reaching certain soil moisture levels. This is important to understanding how much precipitation is required to reach a threshold that may cause landslides.

Coastal California Storm Surge

- D. Cayan is leading the development of the future SLR projections throughout CA. Data has been made available to CEC and DWR colleagues.

DWR 2: Alluvial Fan Flooding Climatology

- Held landslide meeting end of November to coordinate efforts between DWR---1 and DWR---2 landslide projects.
- N. Oakley's paper on post---fire debris flow is in revisions.
- N. Oakley is using RAWs 15 min data developed an extreme precipitation climatology for California. This will examine what areas are most susceptible to precipitation that is associated with landslides and post---fire debris flows.
- N. Oakley and J. Lancaster (CGS) are participating in an extreme precipitation and post---fire debris flow monitoring effort and reporting to DWR.
- M. Asagari is beginning to look at statewide soil moisture.
- B. Henn is helping to obtain VIC soil moisture data to examine antecedent soil moisture conditions prior to landslides.

- The publication below was submitted:
 - o Gershunov A., T.M. Shulgina, F.M. Ralph, D. Lavers and J.J. Rutz, 2016: Assessing climate---scale behavior of Atmospheric Rivers affecting western North America. *Geophysical Research Letters* (in review).
- A. Gershunov presented a poster at the AGU entitled "Atmospheric Rivers and Historic California Floods: A Look in the Past and a Peek in the Future."
- A. Gershunov presented a talk at the 8th EGU Leonardo Conference entitled "Assessing Climate---Scale Behavior of Atmospheric Rivers and Related Precipitation Over California."
- CW3E began making a database of the largest 8---station index precipitation events to use to examine the dynamics of these large events and if there are precursors that can be predicted at longer lead times.
- The Winter Outlook Workshop was held on Nov 16---18 at Scripps Institution of Oceanography.

DWR 4: Extreme Precipitation Decision Support Tool Development

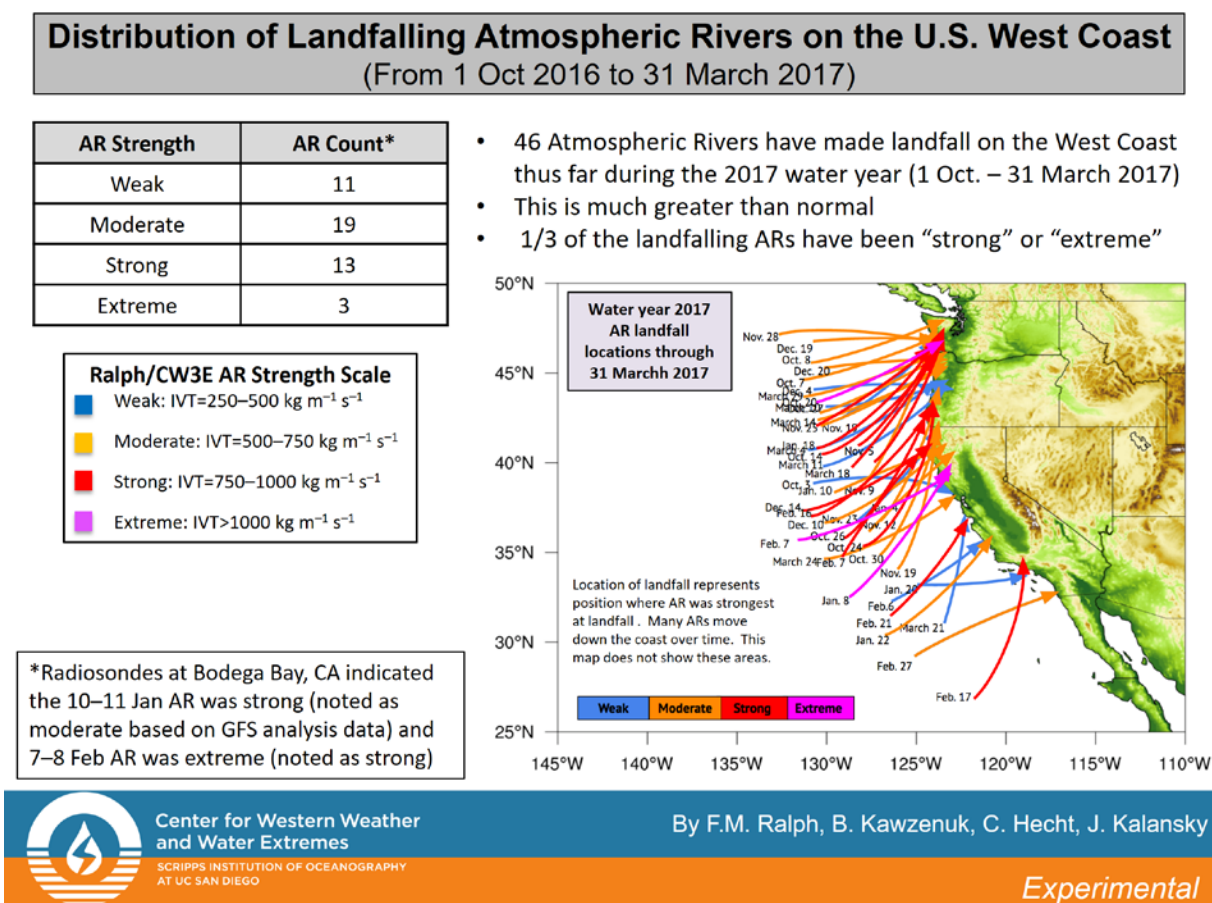
- C. Hecht began developing to codes to pull forecast and observation data for analysis that can be shown on a google maps interface.
- Arranged for J. Cordeira to spend January – March 2017 at Scripps to work on the tool development with the CW3E team.

How Many Atmospheric Rivers Have Hit the U.S. West Coast During the Remarkably Wet Water Year 2017?

It has been well established that much of the west coast receives roughly 30-50% of its annual precipitation from landfalling atmospheric rivers. One of the goals of CW3E is to provide timely information on atmospheric rivers and their impacts on water in the West. The analysis presented here is based upon examination of AR conditions on each day from 1 October 2016 through 31 March 2017. Research-based criteria for AR identification have been used, especially the strength of integrated vapor transport (IVT). ARs are also ranked according to a simple scale introduced in 2016 (see inset in the graphic for the scaling).

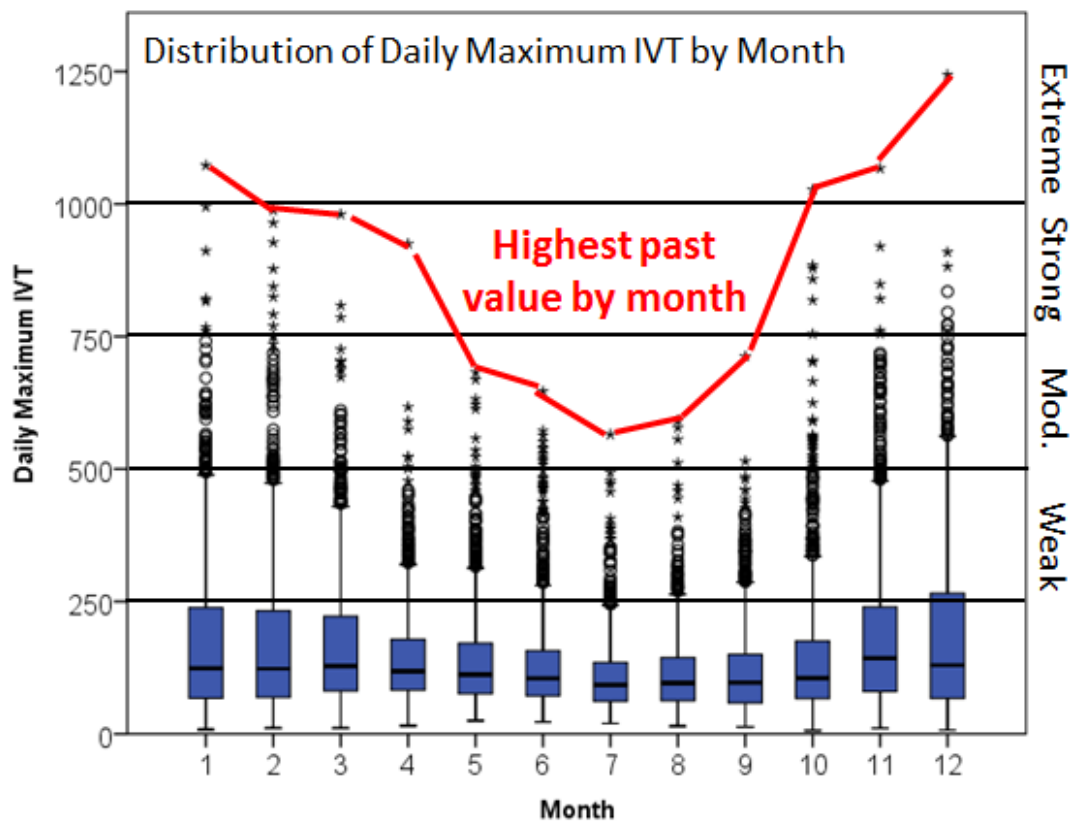
As would be expected, one reason this winter has been so wet in the west is the large number of landfalling ARs. In addition, a large fraction of these events has been strong, or even extreme, in magnitude, and have caused serious flooding, and incidents like the Oroville Dam spillway issue.

Contacts: F. Martin Ralph, Chad Hecht, Brian Kawzenuk



There have been 46 total atmospheric rivers that have made landfall over the U.S. West coast from 1 October to 31 March 2017. Of the 46 total ARs, 11 have been Weak, 19 have been Moderate, 13 have been Strong, and 3 have been Extreme (Based on IVT magnitude). 1/3 of the landfalling ARs have been “strong” or “extreme”.

As we move through spring, the strength and number of ARs begins to diminish as we transition to our dry summer conditions. The plot below shows the historic range (1980-2016) of daily integrated vapor transport (IVT) sorted by month. IVT is the measure of moisture transport used to determine the strength of an AR. Note most days in the historical record do not have ARs. A small number of days make up the extremes. From the plot below, no extreme ARs have been observed from March through September, and no strong ARs have been observed from May through September. The historical peak IVT occurred in December with an AR event in December of 1995. The maximum January IVT was the AR that caused the 1997 floods.



CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Basin Studies

Sponsor/Program Manager	Curtis Anderson (NRO-Klamath), John Andrew
Project Manager	Peter Coombe

Project Status:

Complete

Project Objective:

To participate and provide technical assistance in USBR Basin Study work in California

Project Description:

Strategies need to be developed for meeting projected future water demands where supplies may not be sufficient. Need to focus on basins or sub-basins where imbalances in water supply and demand exist or may exist in the future. The Department of the Interior's WaterSMART Program provides an opportunity for Non-Federal Cost Share Partners and technical stakeholder agencies to participate in the basin study process.

The Basin Study Program is part of the Department of the Interior's WaterSMART Program, which addresses 21st century water supply challenges such as population growth, increased competition for finite water supplies, and climate change.

The Basin Studies are a comprehensive assessment to define current and future imbalances in water supply and demand, to evaluate the effects of climate change on water supply and demand, and to develop and analyze adaptation and mitigation strategies to resolve imbalances in the future. Regional climate staff has been involved in the Los Angeles, Santa Ana River Watershed, Klamath Basin, and Truckee River studies. As cost-share partners for the Klamath Basin Study, regional climate staff is seated on a Technical Working Group.

Project Deliverables/Timeline

Deliverables for 2013:

- LACFCD/USBR Basin Study products: Development of Climate-Adjusted Hydrologic Model Inputs (Oct); Hydrologic Modeling Report (Dec)

Deliverables for 2014:

- LACFCD/USBR Basin Study products: Existing Infrastructure Response & Operations Guidelines Analysis (Sep); Water Supply & Water Demand Projections (Dec)
- Klamath Basin Study product: draft reports for the Klamath Basin Study

Deliverables for 2015:

- LACFCD/USBR Basin Study products: Stormwater Capture Opportunities and Options List; Technical Analysis Criteria; Economic Analysis; Environmental and Social Effects; Trade-Off Analysis; Trade-Off Analysis & Recommendations Interim Report; Infrastructure and Operations Concepts Report (Dec)
- Klamath Basin Study product: a series of nine final technical reports and a final report
- Truckee River Basin Study final report (Dec)

Deliverables for 2016:

- LACFCD/USBR Basin Study products: Trade-Off Analysis and Opportunities (Jan); Study Summary Report (Nov); presentation to Climate Change Program (Jun)
- Sacramento and San Joaquin Rivers Basin Study products: Study Report and Executive Summary, Technical Report, and Appendices (Mar)
- Klamath Basin Study products: updated factsheet; SECURE Water Act Section 9503(c)-Reclamation Climate Change and Water 2016, Chapter 5: Klamath River Basin (Mar); presentation to Climate Change Program and Matrix Team (Jul)
- Truckee Basin Study: presentation to Climate Change Program (Dec)

Deliverables for 2017:

- Sacramento and San Joaquin Rivers Basin Study - presentation to Climate Change Program (Jan)

Success Determination - Performance Metrics

DWR assistance and participation in the Basin Studies leading to the release of final study documents.

Customers:

Local agencies (e.g., SAWPA, LACFCD, Truckee Meadow Water Authority, TRPA, Truckee River Flood Management Authority, Placer County Water Agency, El Dorado County Water Agency, Stockton East Water District, the California Partnership for the San Joaquin Valley, and the Madera County Resource Management Agency), DWR, State of Oregon's Water Resources Department, and USBR

Funding Information:

Project Budget (Annual):	\$42,000	Funding Source:	Prop 84 (15/16), GF 16/17
Budget Notes:	\$16,640- NRO staff work \$22,000/yr - SRO work, 2012-2015 (LACFCD-draft plan of study and subsequent STAC involvement began in Dec 2011) \$3,000 - DSIWM work, Sacramento/San Joaquin Rivers		
Project Start Date:	2011	Project End Date:	

External Partners:

USBR; State of Oregon's Water Resources Department, local agencies (e.g., SAWPA, LACFCD, Truckee Meadow Water Authority, TRPA, Truckee River Flood Management Authority, Placer County Water Agency, El Dorado County Water Agency, Stockton East Water District, the California Partnership for the San Joaquin Valley, and the Madera County Resource Management Agency)

Internal: DWR Climate Program & Regional Office/Headquarters Staff

2016 Project Accomplishments

Continued collaboration occurred with USBR as a DWR cost-share partner on the Klamath Basin Study, which identified climate change impacts to water supplies and demands and evaluated potential adaptation strategies to address any identified supply/demand imbalances. Adaptation strategies resulting from the Basin Study may be recommended for more detailed analysis.

Further information can be found at the Klamath Basin Study site: <https://www.usbr.gov/mp/KBStudy/index.html>. An updated factsheet from 2016 was posted at <https://www.usbr.gov/climate/secure/docs/2016secure/factsheet/KlamathRiverBasinFactSheet.pdf>. The "SECURE Water Act Section 9503(c)-Reclamation Climate Change and Water 2016 Chapter 5: Klamath River Basin" was released in March 2016 (<https://www.usbr.gov/climate/secure/docs/2016secure/2016SECUREREport-chapter5.pdf>). Subsequently, regional staff presented the findings to the Climate Change Program and Matrix Team in July 2016.

The Sacramento and San Joaquin Basin Study, in which headquarters staff participated, was funded by USBR, DWR, El Dorado County Water Agency, Stockton East Water District, the California Partnership for the San Joaquin Valley, and the Madera County Resource Management Agency. The purpose of the study was to assess current and future water supplies and demands in the Sacramento, San Joaquin, and Tulare Lake Basins and adjacent areas that contribute to or receive water from these basins, and to identify a range of potential strategies to address any projected imbalances. The Basin Study Report and Executive Summary, Technical Report, and Technical Appendices were completed in March 2016 and can be found at <https://www.usbr.gov/watersmart/bsp/completed.html>.

Regional staff had earlier participated in the Truckee Basin Study, which was completed in December 2015 and can be found at <https://www.usbr.gov/watersmart/bsp/completed.html>. Staff presented the findings to the Climate Change Program in December 2016.

The Los Angeles Stormwater Conservation Study co-led by Los Angeles County Flood Control District and USBR has been completed. Staff participated in the Stakeholder Technical Advisory Committee, which included reviewing and providing input on draft scopes of work and reports and last met in December 2015. The Trade-Off Analysis Report was finalized in January 2016 and can be found at the Study website (<https://www.usbr.gov/lc/socal/basinstudies/LABasin.html>). Regional staff provided a synopsis of the project in June 2016 to the Climate Change Program. The Study Summary Report was eventually released in November 2016 (<https://www.usbr.gov/watersmart/bsp/docs/fy2017/LABasinStudySummaryReport.pdf>).

Annual Reporting Category before 2015

Planning, Modeling, and Data Collection

Climate Change Objectives

- O I: Develop and Improve Communication, Outreach and Education on Climate Change
- O III: Integrate Climate Change into DWR's Programs and Activities
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Make Conservation a California Way of Life
Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Protect and Restore Important Ecosystems
Manage and Prepare for Dry Periods
Expand Water Storage Capacity and Improve Groundwater Management
Provide Safe Water for All Communities
Increase Operational and Regulatory Efficiency

Safeguarding California Implementation Plan

Support Regional Groundwater Management for Drought Resiliency
Diversify Local Supplies and Increase Water Use Efficiency
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each Reinforces Sustainable Development That is Resilient to Climate Changes
Protect and Restore Water Resources for Important Ecosystems
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
IRWM
UWMP

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Bulletin 195 Update

Sponsor/Program Manager

Division of Flood Management, Office of the State Climatologist

Project Manager

Peter Coombe / Michael L. Anderson

Project Status:

On Going

Project Objective:

The objective is for data from verified stations to feed into a database in coordination with Dr. Michael Anderson's (current State Climatologist) efforts for emergency response and planning initiatives and monitor for climate change; provide relevant climate data and value added products to the data providers and the general public.

Project Description:

This initiative will be focused on Jim Goodridge's (former State Climatologist) critical and unique knowledge of precipitation Depth-Duration-Frequency curves and annual extremes data sets that make up Bulletin 195. A bulletin 195 update is in progress, but will require succession planning to facilitate a station update and verification process in order to facilitate the process of collecting, storing, and analyzing precipitation data from various sources throughout California. The project will provide an updated station location dataset of Bulletin 195 data sources.

Project Deliverables/Timeline

Data from verified stations will feed into databases resulting in an extreme precipitation analysis that will ultimately be available from map-based servers from DWR's Flood Emergency Response Information Service. Web-based map server for Bulletin 195 data, data updating toolkits, full EPN sites with data flow to CDEC. The Flood Emergency Response Information Exchange (FERIX) will house a new map-based server for (former State Climatologist) Jim Goodridge's precipitation Depth Duration-Frequency curves and annual extremes data sets that make up Bulletin 195. This will greatly facilitate the serving of the data which was handled through a now discontinued ftp site with over 4000 spreadsheets. Data requests and data collection for this effort will be transitioned from Jim Goodridge to DWR in the coming years.

Success Determination - Performance Metrics

Depth Duration Frequency (DDF) precipitation analysis data values made available on web-based server. Data updated on a water year basis. Continued coordination with retired State Climatologist Jim Goodridge to provide updated annual rainfall information for extreme precipitation analysis.

Customers:

Emergency response, Division of Safety of Dams, engineering design, and the general public.

Funding Information:

Project Budget (Total):	\$10,000	Funding Source:	Prop 84 (15/16), GF 16/17
Budget Notes:			
Project Start Date:		Project End Date:	

External Partners:

Division of Flood Management, Division of Safety of Dams; GEI Consultants Inc.

2016 Project Accomplishments

Continued coordination with retired State Climatologist Jim Goodridge to update station data and verify information for Bulletin 195. Improvements made to the web-based server application. Work continued on enabling the server application to update the B195 files. Map-based server now accessible through FERIX at:
<http://ferix.water.ca.gov/webapp/precipitation/>

Annual Reporting Category before 2015

N/A

Climate Change Objectives

O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Taking Action to Reduce Residual Risk

State Water Project Related?

Yes

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Increase Flood Protection

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

California Netherlands Water Resources Cooperation and Exchange

Sponsor/Program Manager	John Andrew
Project Manager	Andrew Schwarz

Project Status:

On Going

Project Objective:

DWR has formed a cooperative partnership with the Rijkswaterstaat in the Netherlands to exchange information and expertise about topics of common interest.

Project Description:

In March 2011, a delegation from the Dutch Rijkswaterstaat visited California for a series of discussions and tours of California water facilities. In February 2012, a Letter of Intent was signed between DWR and the Rijkswaterstaat to continue cooperation and information exchange in the areas of integrated water management, operational water management, and policy planning on water management with special consideration to the impacts of climate change on those aspects of water management.

Project Deliverables/Timeline

N/A

Success Determination - Performance Metrics

This activity is a professional exchange of information and ideas. Success in the project will be measured by continued agreement by the parties to engage and contribute to the collaboration.

Customers:

No External customers at this time, this is a professional development, information sharing, and relationship development project.

Funding Information:

Project Budget (Annual):	\$5,000	Funding Source:	N/A
Budget Notes:	Attendance and preparation for quarterly meetings. Budget may increase in future if a joint project is identified as planned.		
Project Start Date:	2012	Project End Date:	In Progress

External Partners:

Rijkswaterstaat of The Netherlands

2016 Project Accomplishments

In 2016, three webinars were held between the Rijkswaterstaat and DWR. Topics included: Water Supply Reliability, partnership evaluations, development of future collaborations and communications.

Annual Reporting Category before 2015

Planning, Modeling, and Data Collection

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related? Yes

Governor's Water Action Plan

N/A

Safeguarding California Implementation Plan

N/A

Legislative and Gubernatorial Mandates

N/A

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

California Water Plan (CWP) Update 2018 – Climate Change content

Sponsor/Program Manager	John Andrew
Project Manager	Andrew Schwarz

Project Status:

On Going

Project Objective:

Provide climate change content related to CA water resources for the 2018 CWP.

Project Description:

California Water Plan Update 2018 will build on and refine analyzes done in CWP Update 2013. Water Plan program managers are currently defining the scope and focus of CWP Update 2018 which will likely follow a significantly different format and focus from previous CWP updates. Climate Program staff have been involved in discussions regarding climate change information incorporation. As of June, 2016 the plan is to update the WEAP model to be consistent with improvements made by SWRCB and USBR over the last 5 years and to run new climate scenarios based on the 10 GCMs selected by the DWR CCTAG.

Project Deliverables/Timeline

By September 2016, Climate Change Staff working with Data Analysis Branch staff will develop the input data files needed to run WEAP with 20 climate scenarios based on the GCMs selected by the CCTAG and new LOCA downscaling provided by Scripts.

Success Determination - Performance Metrics

Development and publication of new climate change projections and modeling outputs based on the latest available science.

Customers:

Legislators, the public, water managers

Funding Information:

Project Budget (Total):	\$35,000	Funding Source:	
Budget Notes:	<p>\$13,000 was contributed to a contract to MWH for modeling services to assist with updating the WEAP model and re-running it with a new suite of climate scenarios.</p> <p>Climate change and data analysis staff will expend an additional \$22,000 on this effort, \$12,000 on data development, \$10,000 on coordination, analysis, and writing up of results.</p>		
Project Start Date:	January 2015	Project End Date:	December 2018

External Partners:

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2016 Project Accomplishments

All data needed to construct the scenarios has been acquired. Multiple meetings with the project team were held to review the methodology used in 2013 and to make decisions about continuation of previous methodologies or to proceed with methodological improvements. Multiple preliminary tests have been completed to confirm that data and processing scripts are appropriate and are producing reasonable results. Final development of climate change inputs for the WEAP model are expected to be completed and available for processing by the Water Plan modeling team during the 1st quarter of 2017.
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Annual Reporting Category before 2015

N/A

Climate Change Objectives

O I: Develop and Improve Communication, Outreach and Education on Climate Change O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Ensuring Reliable Water Supply for All Californians Building Capacity for Regional Sustainability Taking Action to Reduce Residual Risk Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

Manage and Prepare for Dry Periods

Safeguarding California Implementation Plan

Continue to Mainstream Climate Considerations into Water Management Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks
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Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure California Water Code for California Water Plan
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CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Central Valley Flood Protection Plan - Incorporating Climate Change into the 2017

Sponsor/Program Manager	Michael Mierzwa
Project Manager	Amarjot Bindra / Samson Haile-Selassie

Project Status:

On Going

Project Objective:

The 2017 Central Valley Flood Protection Plan needs to incorporate Climate Change into its planning scenarios. The goal of the 2017 CVFPP is to Improve flood risk management in the Central Valley by making improvements to the facilities of the State Plan of Flood Control (SPFC) which is a 1,600 mile system of levees, weirs, bypasses and pumping plants along the Sacramento and San Joaquin Rivers in California's Sacramento and San Joaquin valleys. The CVFPP will be informed by three planning efforts: Sacramento and San Joaquin Valley Basin-Wide Feasibility Studies, the ecosystem Conservation Strategy, and six Regional Flood Management Plans. The 2012 CVFPP had a Climate Change strategy and the 2017 CVFPP is updating the Climate Change strategy. More specifically, improving flood risk management will be achieved through the promotion of multi-objective projects, improving facility operations and maintenance, restoration of ecosystem functions, and improving institutional support. Implementation of the 2017 CVFPP will accomplish: improvements to public safety (save lives), reduced expected annual damages, target species recovery, and improved ecosystem services.

Project Description:

In order to achieve a more resilient Central Valley flood management system whose principal component is the State Plan of Flood Control, climate informed hydrology needs to be incorporated into the CVFPP planning process. The CVFPP Climate Change approach is using the latest science and is designed to be flexible to incorporate new information as it is made available. The process involves integrating information related to atmospheric rivers, general atmospheric circulation models and temperature data that leads to the development of watershed models that can be used to develop hydrographs for various return periods. The Climate Change hydrology is being developed using scientifically supported global climate projections and in coordination with ongoing climate research and the results of that research including data from the USACE, NOAA, USGS, UC Davis and Scripps. As part of the CVFPP Climate Change analysis, a series of Climate Change scenarios are being developed by varying temperature and precipitation changes and changes to flow-frequency curves. Preliminary results show that changes in flood volumes due to modeled Climate Change scenarios will not be uniform across the watersheds. Current efforts focus on converting computed unregulated flows (flows upstream of flood control reservoirs) to regulated flows (flows downstream of reservoirs).

Project Deliverables/Timeline

Incorporate climate change informed hydrology into Central Valley flood planning process (CVFPP) to ensure project goals of achieving sustainable 200-year urban level of flood protection is achieved for urban and urbanizing communities that are protected by the levees of the SPFC; and that sustainable level of flood protection is achieved for small communities protected by the levees of the SPFC.

Draft documentation of climate change analysis was completed in 2016.

Success Determination - Performance Metrics

The project will be considered successful with the following three key metrics.

- 1) Use: The analysis is used to inform and refine flood management actions plan that reduce vulnerability and increase resilience to floods.
- 2) Dissemination: The details of project (approach and results) are shared in scientific/technical forums and with interested public and stakeholder groups that include private, federal, local, and state agencies.
- 3) Project continuity: The project is a multi-phase effort that continues building upon latest knowledge and tools for evaluating the impacts of climate change.

Customers:

Central Valley Flood Protection Board, Central Valley cities and counties, Central Valley residents, levee maintaining districts/agencies

Funding Information:

Project Budget (Total):	\$600,000	Funding Source:	Proposition 1E and small amount of General Fund.
Budget Notes:	Prop 1E funds		
Project Start Date:	July 2012. Work on the 2017 Central Valley Flood protection Plan (CVFPP) was begin immediately after the adoption of the 2012 CVFPP by the Central Valley Flood Protection Board. Climate Change analysis was incorporated in the 2012 CVFPP and is being updated	Project End Date:	2017

External Partners:

CVFPB, DFW, DSC, DPC, Delta Conservancy, USACE, USFWS, BDCP (Water Fix-Eco Restore), Central Valley cities and counties, and Central Valley flood management and levee maintaining agencies.

2016 Project Accomplishments

Climate change hydrology was used in development of the 2017 CVFPP Update flood risk analysis reported in the Public Draft of the plan update.

Annual Reporting Category before 2015

Planning, Modeling, and Data Collection

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O III: Integrate Climate Change into DWR's Programs and Activities
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels

IWM Business Categories

Managing Floodwaters while Protecting the Ecosystem
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related? No

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Protect and Restore Important Ecosystems
Expand Water Storage Capacity and Improve Groundwater Management
Increase Flood Protection
Increase Operational and Regulatory Efficiency
Identify Sustainable and Integrated Financing Opportunities

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Continue to Mainstream Climate Considerations into Water Management
Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each
Reinforces Sustainable Development That is Resilient to Climate Changes
Protect and Restore Water Resources for Important Ecosystems
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Citizen Science

Sponsor/Program Manager

Division of Flood Management, Office of the State Climatologist

Project Manager

Peter Coombe

Project Status:

On Going

Project Objective:

The goal is to expand citizen science precipitation monitoring throughout California through the Community Collaborative Rain, Hail & Snow (CoCoRaHS) network.

Project Description:

DWR's integration with citizen science programs needs to be updated and expanded. Since the inception of DWR we have been a long term proponent of using volunteers or "citizen scientists" to help us collect valuable data to aid in water resources management in the State. In recent years, several of these programs including DWR's Volunteer Climate Cooperator Network (VCCN) have been in a steady decline to the point of almost non-existence.

In the field of Water Resources, there are many emerging citizen science projects that show promise for data collection, awareness education, and providing a platform to enable public participation. We will be focusing outreach efforts to expand the Community Collaborative Rain, Hail & Snow (CoCoRaHS) network project throughout California. This project will reinvigorate citizen science in the State and in turn will bolster existing data collection efforts related to weather and climate.

This project will initiate an effort to migrate all of DWR's VCCN stations to the CoCoRaHS network, a non-profit network of over 15,000 citizen scientists throughout the United States and Canada. We will also work to recruit additional volunteers from multiple sources including tribal groups.

Project Deliverables/Timeline

(2013-2015) Promotion of CoCoRaHS at RWMG meetings

(2013) Presentation at SAWPA Government Alliance Pillar meeting (2013-2014) Guest lectures at CSU Chico on Citizen Science/Crowdsourcing and CoCoRaHS

(2014-2015) Integration of CoCoRaHS in DWR Project WET climate change workshops

(2015) CoCoRaHS pop-up poster

(2016-2017) Continue to promote citizen science at teacher workshops and water conferences throughout California. Promote CoCoRaHS by providing rain gauges to willing volunteers with an emphasis on schools and educational institutions.

Success Determination - Performance Metrics

Promote citizen science during outreach opportunities. Recruit volunteers to participate in the CoCoRaHS network. Number of people participating.

Customers:

Schools and teachers, local and regional water management groups, public, citizen scientists/volunteers

Funding Information:

Project Budget (Annual):	\$16,000	Funding Source:	Prop 84 (15/16), GF 16/17
Budget Notes:	SRO staff - \$11,000/yr; NRO staff - \$5,000/yr		
Project Start Date:	2012	Project End Date:	

External Partners:

Within DWR - Public Affairs Office, Department of Flood Management, Division of Safety of Dams; Federal - National Weather Service, NOAA; Others - Colorado Climate Center, CoCoRaHS network, Water Education Foundation/CA Project WET

2016 Project Accomplishments

The DWR Climate Team informed stakeholders about citizen science by promoting the Community Collaborative Rain, Hail & Snow (CoCoRaHS) network. Staff continued to provide brochures and flyers on the network, as well as present the CoCoRaHS pop-up poster that was created in 2015. CoCoRaHS and other citizen science organizations were identified as resources for teachers who attended the Climate Change Program's Project WET workshops in 2016 (Riverside, West Sacramento, San Jose, and Visalia).

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

- | |
|--|
| <ul style="list-style-type: none"> O I. Develop and Improve Communication, Outreach and Education on Climate Change O II: Tribal Engagement on Climate Change O III: Integrate Climate Change into DWR's Programs and Activities O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research |
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IWM Business Categories

Ensuring Reliable Water Supply for All Californians

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life Manage and Prepare for Dry Periods Increase Flood Protection

Safeguarding California Implementation Plan

Diversify Local Supplies and Increase Water Use Efficiency
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Protect and Restore Water Resources for Important Ecosystems
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

IRWM

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Climate Action Plan: Phase II (Internal DWR Policies on Climate Change Mitigation, Analysis, and Adaptation)

Sponsor/Program Manager	Andrew Schwarz, Katy Spanos
Project Manager	Andrew Schwarz

Project Status:

On Going

Project Objective:

Develop comprehensive DWR policies and procedures to guide climate change analysis, and adaptation on activities performed by DWR

Project Description:

Phase II of the Climate Action Plan will be a guidance framework and data toolbox to guide incorporation of climate change in future planning analysis of DWR projects and activities. Completion of Phase II will result in a guidance document and an accompanying climate scenario toolbox to assist DWR project managers with assessing the need for climate change analysis in their planning activities and guiding decision making for selection of analytical tools and analysis procedures, as well as, assumptions about future conditions. The guidance framework will ensure that DWR projects meet standards for consistency, quality, and adequacy in climate change analysis. This phase of the Climate Action Plan builds on the December 2010 publication of "Climate Change Characterization and Analysis in DWR Planning Studies" by Abdul Khan and Andrew Schwarz. This foundational document is a comprehensive and comparative review of planning studies conducted by DWR and its partner agencies that have addressed climate change.

Project Deliverables/Timeline

Phase II completion in 2017

Success Determination - Performance Metrics

Completion and Adoption of Guidance document and framework for conduction climate change analysis throughout the department's programs

Customers:

DWR project managers

Funding Information:

Project Budget (Annual):	\$50,000	Funding Source:	N/A
Budget Notes:			
Project Start Date:	2009	Project End Date:	In Progress

External Partners:

DWR Climate Change Technical Advisory Committee

2016 Project Accomplishments

A project outline and plan were developed in 2016 and several meeting were held to refine and focus the structure of this project. Substantial progress was also made on development of a draft guidance document. A draft guidance document is expected to be circulated for review in the 1st quarter of 2017.

Annual Reporting Category before 2015

Business Practices & Technical Expertise

Climate Change Objectives

O I. Develop and Improve Communication, Outreach and Education on Climate Change
O III: Integrate Climate Change into DWR's Programs and Activities
O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

N/A

Safeguarding California Implementation Plan

Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Climate Action Plan: Phase III - Part B (Internal DWR Policies on Climate Change Adaptation)

Sponsor/Program Manager	John Andrew
Project Manager	Robert Tibstra

Project Status:

Project Initiation Only

Project Objective:

Develop comprehensive DWR policies and procedures to guide climate change adaptation on activities conducted by DWR.

Project Description:

Phase III - Part B of the Climate Action Plan will be a DWR Climate Change Adaptation Plan. The plan will address the vulnerabilities from Climate Change to DWR-owned and operated facilities and DWR's activities throughout the state, all of which were identified in Part A, the Vulnerability Assessment. The plan will include adaptation strategies to address those vulnerabilities.

Project Deliverables/Timeline

Phase III - Part B completion: Adaptation Plan to be completed by end of 2019.

Success Determination - Performance Metrics

The final Adaptation Plan is put into use across the Department to assist long-range strategic planning for DWR.

Customers:

DWR Project Managers

Funding Information:

Project Budget (Annual):	\$99,200	Funding Source:	General Funds
Budget Notes:			
Project Start Date:	2017	Project End Date:	2019

External Partners:

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2016 Project Accomplishments

--12/2016--three phone meetings were conducted to assemble background information from an interdisciplinary team that worked on the Vulnerability Assessment for the purpose of planning the approach to developing an Adaptation Plan in relation to the vulnerability assessment.
--The subgroup members were identified and developed plans to meet in 2017 at monthly intervals to discuss the development of the Adaptation Plan.
--Set the kickoff meeting for subgroup to be held 1/2017.

Annual Reporting Category before 2015

N/A

Climate Change Objectives

O III: Integrate Climate Change into DWR's Programs and Activities

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Protect and Restore Important Ecosystems
Manage and Prepare for Dry Periods
Increase Flood Protection

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure
California Water Code for California Water Plan

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Climate Action Plan: Phase III -Part A [VA] (Internal DWR Policies on Climate Change Mitigation, Analysis, Adaptation)

Sponsor/Program Manager	John Andrew
Project Manager	Michelle Selmon / Andrew Schwarz

Project Status:

On Going

Project Objective:

Develop comprehensive DWR policies and procedures to guide climate change mitigation, analysis, and adaptation on activities performed by DWR.

Project Description:

Phase III - Part A of the Climate Action Plan will be a DWR Climate Change Vulnerability Assessment. The assessment will entail identifying DWR owned and operated facilities and DWR's activities throughout the state.

Project Deliverables/Timeline

Phase III completion: Vulnerability Assessment to be completed by end of 2016

Success Determination - Performance Metrics

The Vulnerability Assessment is complete and serves as a baseline for current exposure, sensitivity and adaptive capacity of DWR staff activities, operations and facilities. Staff consider the results as they design long-term projects.

Customers:

DWR project managers

Funding Information:

Project Budget (Total):	\$300,000	Funding Source:	N/A
Budget Notes:			
Project Start Date:	2013	Project End Date:	2016

External Partners:

Phase III: TBD

2016 Project Accomplishments

Phase III - Part A (Vulnerability Assessment) is complete, all comments have been incorporated, and is awaiting management review and approval.

Annual Reporting Category before 2015

Business Practices & Technical Expertise

Climate Change Objectives

O III: Integrate Climate Change into DWR's Programs and Activities

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Manage and Prepare for Dry Periods
Increase Operational and Regulatory Efficiency

Safeguarding California Implementation Plan

Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Climate Change Data Subgroup

Sponsor/Program Manager	Elissa Lynn, Michael Anderson
Project Manager	Peter Coombe

Project Status:

On Going

Project Objective:

Assessment and coordination of climate change data needs for internal DWR projects and provide data support for external partners.

Project Description:

DWR's Climate Change Basic Data group is composed of representatives from DSIWM and the Division of Flood Management, and DWR's regional offices. The project goals are to assess current climate data acquisition efforts at DWR, promote cooperation and coordination across programs, and strategize on issues of data storage, management, and dissemination.

Project Deliverables/Timeline

Hydroclimate Report- 2016 Final Draft
DWR historical data inventory/consolidation- Ongoing
Citizen Science, promoting the CoCoRaHS precipitation network- Ongoing
SGMA- Data deliverables to groundwater sustainability agencies-2016
Rain/Snow Trends paper to be completed for journal submission

Success Determination - Performance Metrics

There is increased information sharing and collaboration on climate data needs for DWR, cooperating agencies, and the public. Annual Hydroclimate Report and completion of data projects with external partners.

Customers:

State of California Agencies, General Public, DWR Staff

Funding Information:

Project Budget (Annual):	\$140,000	Funding Source:	Prop 84 thru 15/16, GF starting in 16/17
Budget Notes:			
Project Start Date:	May 2011	Project End Date:	N/A

External Partners:

Western Regional Climate Center (WRCC), NOAA

2016 Project Accomplishments

In 2016, the Climate Change Data Subgroup continued to strategize on data collection, climate reports, research papers, and to address data management issues within DWR. Bi-monthly meetings were held to work on a number of ongoing projects. Project accomplishments for 2016 included the release of the first DWR California Hydroclimate Report for the Water Year 2015. The report includes climate tracking indicators such as precipitation, temperature, snowpack, and streamflow in order to visualize long term climate trends. Other accomplishments include working on a partnership with the Western Regional Climate Center to update the California Climate Tracker Webpage and a partnership with CSUS to assist with cataloging and digitizing historical precipitation and temperature records.

Annual Reporting Category before 2015

Planning, Modeling, and Data Collection

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ III: Integrate Climate Change into DWR's Programs and Activities
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- ☐ V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

Manage and Prepare for Dry Periods

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Support Regional Groundwater Management for Drought Resiliency
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Continue to Mainstream Climate Considerations into Water Management
N/A

Legislative and Gubernatorial Mandates

EO S-13-08: NRC SLR Study
SGMA

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Climate Change FAQs and Responses

Sponsor/Program Manager	John Andrew, Elissa Lynn
Project Manager	Michelle Selmon

Project Status:

Complete

Project Objective:

To goal is to develop a list of FAQs that clearly articulate climate change facts in 'plain language' for use in presentations and meetings. Objectives include the following: (1) create a list of questions that have been asked of Climate Change Team members during meetings and presentations and prepare short, articulate responses; (2) identify additional likely FAQs that may be asked in the future based on trends, polls, or 'hot' news items and develop responses; and (3) update the website with short FAQs related to climate change and water impacts (possibly include links to 'reliable' FAQ sites on climate change, such as NASA, IPCC, and others)

Project Description:

Climate change science is complex and nuanced, and many members of the public are not well-versed on the facts about the topic. Laypersons commonly get their knowledge from popular press news stories and/or political commentary, which frequently oversimplifies the issue and in some cases provides misleading or incorrect information. This can lead to confusion about the strength and veracity of the science which clearly implicates the role human activities such as the burning of fossil fuels and deforestation on climate changes that have occurred in the past 100 years.

Regional Climate Change Specialists and other members of the Climate Program are frequently asked clarifying questions about the issue in private and public forums, and it is important that answers are consistent and framed in a way that is scientifically accurate, yet doesn't overly rely on technical jargon that only confuses or even 'turns off' people to the issue. Clear and concise communication is very important.

This project will result in a list of FAQs and responses that Climate Team members can use to help them be prepared for, and succinctly respond to, questions commonly asked of them.

Project Deliverables/Timeline

Draft list of climate change myths and refutations - 2015
Final list of climate change myths and refutations - 2016
Related list of FAQs - 2016 (not based on common myths but rather technical questions about climate change that are frequently asked by people with some knowledge of the subject who would like to understand it at a deeper level)

Success Determination - Performance Metrics

Regional Climate Change Specialists are well prepared to answer common questions about the topic and all respond consistently.

Customers:

DWR climate change staff
If posted on the website the Myths and Refutations document could be used by the public

Funding Information:

Project Budget (Annual):	\$1,920	Funding Source:	Prop 84 (15/16); GF (16/17)
Budget Notes:			
Project Start Date:	January 2015	Project End Date:	December 2016

External Partners:

N/A

2016 Project Accomplishments

No changes were made to the myths and refutations list nor FAQs in 2016. This project will be considered completed, but another project on climate change messaging has been initiated and will build upon these materials.

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

O I. Develop and Improve Communication, Outreach and Education on Climate Change

IWM Business Categories

Building Capacity for Regional Sustainability

State Water Project Related?

No

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government

Safeguarding California Implementation Plan

Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Climate Change Matrix Team

Sponsor/Program Manager

Gary Bardini

Project Manager

John Andrew / Elissa Lynn

Project Status:

On Going

Project Objective:

Communication and coordination of climate change activities across DWR

Project Description:

DWR's Climate Change Matrix Team includes representatives from every division and major program in the Department. The team of approximately 50 staff (membership is on the last page of the annual report) meets quarterly to communicate and coordinate on climate change issues. Meetings regularly feature an external speaker on climate change, Department and State policy discussion, and an update from the State Climatologist.

Project Deliverables/Timeline

Quarterly meetings

Success Determination - Performance Metrics

Attendance at quarterly meetings, both by division and in total; level of information exchange, discussion, and coordination at meetings (and outside of the quarterly meetings).

Customers:

DWR management and staff

Funding Information:

Project Budget (Annual):	\$40,000	Funding Source:	Various
Budget Notes:	Budget is not dedicated, rather, an estimate of staff cost (using PY costs and hours).		
Project Start Date:	March 2007	Project End Date:	Ongoing

External Partners:

None

2016 Project Accomplishments

2016's focus was on completing DWR's Climate Action Plan--in particular the team reviewed Department's climate change vulnerability assessment--as well as the consideration of climate risk in public investments; guest speakers included Dr. Marty Ralph (re: atmospheric rivers) and Claire Jahns, Assistant Secretary of CNRA

Annual Reporting Category before 2015

Business Practices & Technical Expertise

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ III: Integrate Climate Change into DWR's Programs and Activities
- ☐ V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government

Safeguarding California Implementation Plan

Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
IRWM

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Climate Change Metrics (for use by local, regional, & other managers)

Sponsor/Program Manager	
Project Manager	Andrew Schwarz

Project Status:

Project Initiation Only

Project Objective:

The goal is to provide clear, regionally specific, and actionable metrics of climate change for use by local and regional resource managers that promote analysis and planning for climate change impacts.

Project Description:

DWR has provided a great deal of climate change guidance to RWMGs. In general this guidance has focused on procedures, decision-making, and planning with a great deal of discretion left to the individual RWMGs about how to do climate change analysis and even what level of climate change they should be planning for. This has resulted in a wide range of approaches taken to characterizing and analyzing potential future effects of climate change for IRWM planning purposes.

While use of the information developed by this project would remain voluntary, DWR would be establishing a consistent dataset of climate change metrics for water resource planning that would assist the vast majority of RWMGs. This would improve consistency of analysis across IRWM regions, would allow the impacts and vulnerabilities of each region to be intercomparable, and would facilitate more sophisticated and complete analyses of climate change impacts by RWMGs interested in integrating more fully climate change mitigation and adaptation into their IRWM plans and project reviews.

This project would develop a set of metrics, tailored specifically to the needs of the RWMGs that would provide information about how important variables of concern (e.g., streamflow, Evapotranspiration, temperature, groundwater recharge) would be expected to change in the future. Metrics would be presented in multiple formats (e.g., time series data, change metrics) so as to be most useful and applicable for the wide range of technical capacities that exist between the RWMGs.

Note that this project is identified in the 2015 CC Strategic Plan as "IRWM Climate Change Metric Development" under the Project Initiation Form.

Project Deliverables/Timeline

Success Determination - Performance Metrics

Customers:

DWR programs; RWMGs; Round Table of Regions

Funding Information:

Project Budget ():		Funding Source:	
Budget Notes:			
Project Start Date:		Project End Date:	

External Partners:

Within DWR - IRWM program, Bay Delta Office, DWR CCTAG; Outside DWR - RWMGs, Round Table of Regions

2016 Project Accomplishments

Project remains on hold. This project is a secondary piece coming out of DWR's Climate Action Plan, Phase II. It is currently not at a point to become an outreach project yet.

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels

IWM Business Categories

N/A

State Water Project Related?

No

Governor's Water Action Plan

N/A

Safeguarding California Implementation Plan

N/A

Legislative and Gubernatorial Mandates

IRWM

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Climate News Digest

Sponsor/Program Manager

John Andrew, Elissa Lynn

Project Manager

Michelle Selmon

Project Status:

On Going

Project Objective:

To goal of the Climate News Digest is to provide information and though-provoking material help DWR and other agency staff stay informed about the issue of climate change so they can understand its relevance to their projects and other work.

Project Description:

A tremendous amount of information about climate change is published daily in many formats, making it a bit overwhelming for people to read it all to stay informed about the latest developments.

A monthly selected compilation of climate news articles, publications, and other information about climate change is distilled from the vast body of information that is available each day into a more digestible form for DWR and other agency staff, water managers, and member of the public.

Items are hotlinked to the original source on the internet and are organized by category so that people can quickly find information that is of most relevance to their work and interests. Sometimes quotes from the article/publication or comments from the Climate News Digest editor are included to provide additional information about the link and its potential relevance.

Project Deliverables/Timeline

The Climate News digest will continue to distribute monthly editions to the list of subscribers (over 250) and also post on the DWR Climate Change website on the Climate News page.

Success Determination - Performance Metrics

New subscribers continue to request to receive the CND, which is reliably distributed within the first few days of each month.

Customers:

DWR and other agency staff working on climate change or those who are interested in how climate change might impact their work, water managers and other resources managers, and members of the public.

Funding Information:

Project Budget (Annual):	\$38,400	Funding Source:	Prop 84 (15/16); GF (16/17)
Budget Notes:			
Project Start Date:	April 2010	Project End Date:	

External Partners:

DWR staff, water managers, and other members of the public

2016 Project Accomplishments

Monthly production of the Climate News Digest continued in 2016. Twelve issues averaging approximately 6-8 pages containing anywhere from 60-100 weblinks each were produced in 2016.

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

O I. Develop and Improve Communication, Outreach and Education on Climate Change

IWM Business Categories

Building Capacity for Regional Sustainability

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life
Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government

Safeguarding California Implementation Plan

Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

SGMA
IRWM

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Climate Resiliency Policy

Sponsor/Program Manager

John Andrew

Project Manager

John Andrew

Project Status:

Project Initiation Only

Project Objective:

A Climate Resiliency Policy will promote the implementation of climate protection practices throughout the department while also supporting the implementation of the Sustainability Policy.

Project Description:

Implementation of DWR's Sustainability Policy includes, in part, a focus on climate protection practices. Some practices are starting to occur within DWR, for example the adoption of the Greenhouse Gas Reduction Plan, projects including analyses of climate change impacts (i.e. BDCP and CVFPP), and the development of adaptation and mitigation strategies for the Water Plan Update 2013. However, climate protection practices are not yet being implemented broadly throughout the department.

The project develops a Climate Resiliency Policy and framework for implementation to facilitate integration of climate change adaptation and mitigation strategies into DWR activities and promote staff acceptance of climate change resiliency as one of DWR's core values. The implementation framework would lay the foundation for addressing the Department's vulnerabilities to climate change and support successful integration of all phases of our Climate Action Plan into DWR programs and projects.

Project Deliverables/Timeline**Success Determination - Performance Metrics****Customers:****Funding Information:**

Project Budget (Total):		Funding Source:	
Budget Notes:			
Project Start Date:		Project End Date:	

External Partners:

DWR-wide

2016 Project Accomplishments

Annual Reporting Category before 2015

N/A

Climate Change Objectives

O III: Integrate Climate Change into DWR’s Programs and Activities

IWM Business Categories

N/A

State Water Project Related? Yes

Governor's Water Action Plan

N/A

Safeguarding California Implementation Plan

N/A

Legislative and Gubernatorial Mandates

N/A

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Data Collection and Climate Services

Sponsor/Program Manager

John Andrew, Elissa Lynn

Project Manager

Michael L Anderson / Peter Coombe

Project Status:

On Going

Project Objective:

Collect relevant climate data to support Department's emergency response and planning initiatives and monitor for climate change; provide relevant climate data and value added products to general public.

Project Description:

DWR continues to develop the Flood Emergency Response Information Exchange (FERIX), a web based platform to provide flood information. Efforts are underway to link information presented in FERIX to the climate data in the California Climate Data Archive. FERIX will also house a new map-based server for (former State Climatologist) Jim Goodridge's precipitation Depth-Duration-Frequency curves and annual extremes data sets that make up Bulletin 195. This will greatly facilitate the serving of the data which was handled through a now discontinued ftp site with over 4000 spreadsheets. Data requests and data collection for this effort will be transitioned from Jim Goodridge to DWR in the coming years.

For observing data systems, DWR is continuing its partnership with the Earth Systems Research Lab of the National Oceanic and Atmospheric Administration (NOAA) and Scripps Institution of Oceanography to deploy new monitoring equipment for extreme precipitation events. For this network, water vapor measurements, wind profilers, soil moisture sensors and freezing level radar are being deployed across the state. The data from this network is currently served through NOAA's Hydrometeorology Testbed website at <http://hmt.noaa.gov>. Efforts continue to get the data into the California Data Exchange Center. Other observing opportunities that are in their initial stages include elements of the Forecast Coordinated Operations Program and the UC Merced observing system in the American River watershed. A new remote sensing monitoring effort using airborne LIDAR measurements of the snowpack is being developed under a joint project between DWR and NASA's Jet Propulsion Laboratory. NOAA has stopped funding for the new Regional Climate Reference Network and is considering streamlining the National Weather Service Cooperative Observer Network.

Project Deliverables/Timeline

Web-based map server for Bulletin 195 data, data updating toolkits, full EPN sites with data flow to CDEC.

Development of a climatology of Atmospheric Rivers working with Scripps Institution of Oceanography, including A/R's role in precipitation extremes in CA, and projected impacts of climate change.

Success Determination - Performance Metrics

Climate and extreme precipitation data made freely available from the Flood Emergency Response Information Exchange (FERIX). Data supported by current research in extreme events with a focus on Atmospheric Rivers. Partnered publications using data from EPN and other networks.

Customers:

DWR, General Public

Funding Information:

Project Budget (Annual):	\$140,000	Funding Source:	Climate Change Program and Division of Flood Mgmt.
Budget Notes:			
Project Start Date:	July 2009	Project End Date:	In Progress

External Partners:

NOAA ESRL, Scripps, Jim Goodridge

2016 Project Accomplishments

FERIX/Climate tab now functioning at: <http://ferix.water.ca.gov/webapp/climate.jsp>. Annual report from NOAA ESRL on Extreme Precipitation Monitoring Network received. Planning continues for future engagement with NOAA ESRL and NIDIS for climate data services NIDIS (National Interagency Drought Information System) group working on Drought Early Warning System Project and Drought Amelioration Determination Project for California and Nevada. State Climatologist working with both groups on 2-year efforts.

Annual Reporting Category before 2015

Planning, Modeling, and Data Collection

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ III: Integrate Climate Change into DWR's Programs and Activities
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- ☐ V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
 Building Capacity for Regional Sustainability
 Managing Floodwaters while Protecting the Ecosystem
 Taking Action to Reduce Residual Risk

State Water Project Related?

Yes

Governor's Water Action Plan

Manage and Prepare for Dry Periods
 Increase Flood Protection
 Increase Operational and Regulatory Efficiency

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources Continue to Mainstream Climate Considerations into Water Management Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks N/A
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Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting SGMA IRWM UWMP
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CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Decision Scaling Analysis of Climate Change Impacts on SWP

Sponsor/Program Manager	John Andrew
Project Manager	Andrew Schwarz

Project Status:

On Going

Project Objective:

Complete a comprehensive vulnerability assessment and adaptation analysis for the SWP

Project Description:

A comprehensive climate change vulnerability assessment of State Water Project operations will be completed. This vulnerability assessment will, for the first time, provide DWR with a comprehensive assessment of its vulnerabilities to changes in State Water Project performance as a result of future changes in climate.

Project Deliverables/Timeline

By August 2016, The team will complete the SWP vulnerability Assessment and present results in the DWR Phase III Climate Action Plan- Vulnerability Assessment.

By September 2017, the team will complete an analysis of a suite of potential climate adaptations for the SWP using the decision scaling platform and will present the results in the DWR Phase III Climate Action Plan- Adaptation Plan.

Success Determination - Performance Metrics

Improve the information available to decision makers when planning for the uncertain effects of climate change on the SWP system by integrating climate change vulnerability-based analysis with traditional risk-based assessment methods.

Customers:

DWR Executive, DWR project managers, SWP customers, SWP contractors

Funding Information:

Project Budget (Total):	\$520,000	Funding Source:	
Budget Notes:	\$200,000 contract with UMass + 320,000 in staff time		
Project Start Date:	March 2013	Project End Date:	September 2017

External Partners:

University of Massachusetts

2016 Project Accomplishments

In 2016, the team completed the development of the preprocessing routines and began running simulations and analysis of the SWP using Callite and the Decision Scaling platform. The team ran more than 2000's climate simulations in 2016 and made substantial leaps in understanding about the SWP system and its response to increasing temperature and sea level and changing (both increasing and decreasing) precipitation. Results from the decision scaling analysis were completed and included in the DWR Climate Action Plan-Vulnerability Assessment in December 2016. In early 2017, the team will finalize an inception report documenting all of the technical steps and advances made to date.

Beginning in 2017, after completion of the inception report, the team will begin making refinements to the decision scaling system based on comments from reviewers and internal qa/qc analysis. And in series will begin development of tools and modeling capacity to evaluate a suite of adaptation strategies that will be included in the DWR Climate Action Plan Phase III- Adaptation Plan.

Annual Reporting Category before 2015

Planning, Modeling, and Data Collection

Climate Change Objectives

O III: Integrate Climate Change into DWR's Programs and Activities

O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Ensuring Reliable Water Supply for All Californians

Taking Action to Reduce Residual Risk

State Water Project Related?

Yes

Governor's Water Action Plan

Manage and Prepare for Dry Periods

Safeguarding California Implementation Plan

Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability

Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity

Continue to Mainstream Climate Considerations into Water Management

Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting

EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

DWR Climate Change Program

Sponsor/Program Manager

John Andrew

Project Manager

Elissa Lynn

Project Status:

On Going

Project Objective:

The Climate Change Program supports all climate change activities across the Department. Specialists in both adaptation and mitigation are located throughout the regional offices, and headquarters. Program goals include providing regionally-specific climate change information to programs, projects, and documents, by accessing and synthesizing research, data, tools, and topical content for California's unique water management issues with regard to a warming climate.

Project Description:

DWR has had a climate change program since 2009. Executive Manager for Climate Change, John Andrew, hired a multidisciplinary team of climate change specialists to serve the Department and public on issues related to climate change and water management. Members are matrixed across and the Statewide Integrated Water Management and Integrated Regional Water Management Divisions. The Climate Change program received funding through FY 15/16 from Proposition 84, and fees from the Air Resources Board under Assembly Bill 32 (Global Warming Solutions Act). In 16/17, the program moved to General Funds. Additional climate change support is provided by Executive, and Water Use Efficiency.

Project Deliverables/Timeline

Continue implementation and updates to the Climate Change Program Strategic Plan, lead Safeguarding CA water sector implementation, and meet legislative and gubernatorial mandates for climate change in the water sector. In 2017, it is anticipated that 2 new "subgroups" will be started; Web and Adaptation Plan.

Success Determination - Performance Metrics

The program-wide objectives all fall under this category. Program management tools, guides and documentation are to be used for all major projects. Another factor used to determine success is budget management (i.e., not going over total program budget). Another measurement will be accessibility and transparency of program activities (including accuracy on the Bond management website and DWR Climate Change program website).

Customers:

California Water Plan, Integrated Regional Water Management, and FloodSAFE programs. The program also provides support to the WETCAT, the Governor's Climate Action Team and the Governor's Water Action Plan

Funding Information:

Project Budget (Annual):	\$2,500,000	Funding Source:	Proposition 84, AB 32, General Fund
Budget Notes:	The program has bond funding and AB32 fee funds to support all activities of the climate change program through FY 15/16. The program began General Funds in FY 16/17 for adaptation work, with continued funding from AB32 for mitigation work.		
Project Start Date:	2009	Project End Date:	In Progress

External Partners:

Matrix managed across multiple divisions of DWR.

2016 Project Accomplishments

The program held four Climate Change Matrix Team meetings in 2016, for climate change speaker presentations, project coordination, and water management issues with DWR divisional representatives. Climate Change staff met regularly to address adaptation and mitigation issues in the following subgroups; Mitigation & Water-Energy, Tribal-Climate Change, Outreach, Data, and the CAP Phase III, Vulnerability Assessment), plus held bi-weekly full team meetings. Under the program, DWR was awarded a Climate Leadership Award in 2016:

<https://www.epa.gov/climateleadership/2016-climate-leadership-award-winners>

Annual Reporting Category before 2015

Business Practices & Technical Expertise

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O II: Tribal Engagement on Climate Change
- O III: Integrate Climate Change into DWR's Programs and Activities
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research
- O VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
 Building Capacity for Regional Sustainability
 Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life
 Achieve the Co -Equal Goals for the Delta
 Protect and Restore Important Ecosystems
 Manage and Prepare for Dry Periods
 Expand Water Storage Capacity and Improve Groundwater Management
 Provide Safe Water for All Communities
 Increase Flood Protection
 Increase Operational and Regulatory Efficiency

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Support Regional Groundwater Management for Drought Resiliency
Diversify Local Supplies and Increase Water Use Efficiency
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each Reinforces Sustainable Development That is Resilient to Climate Changes
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions
EO B-30-15: GHG Emissions Reduction 40% below 1990 levels by 2030, 80% below 1990 levels by 2050
EO B-30-15: State Agencies Implement GHG reductions
EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure
EO B-18-12: Reduce Agency GHG Emissions by 10% by 2015 and 20% by 2020 from 2010 Baseline
EO S-13-08: NRC SLR Study
EO S-13-08: Review and NRC SLR Study Every 2 Years
SGMA
IRWM
UWMP
California Water Code for California Water Plan

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

DWR Climate Literacy

Sponsor/Program Manager

John Andrew

Project Manager

Elissa Lynn

Project Status:

On Going

Project Objective:

The objectives include the following: (1) to conduct literacy classes each year at DWR Training Center, as well as in Regional or Field offices; (2) to partner with other agencies on climate literacy, either participating in their training, or making ours available to the Resources Agency; and (3) to extend climate literacy classes to external audiences, such as UC Davis Extension, or other.

Project Description:

With respect to Objective (1), the class is designed to inform DWR staff about the climate and climate change issues that relate to water management in California. Subject matter experts cover: the climate in California; hydrologic change measurement and analysis; greenhouse gas emissions; State and DWR policies, responses and actions for adapting and mitigating for CO₂; the relationship between work activities and DWR's Climate Action Plan; and the latest research, modeling and science. Engaging activities will result in practical support and help DWR staff impart reliable information on the topic to society at large.

Project Deliverables/Timeline

Smaller to-go versions for other audiences besides DWR Staff.

Success Determination - Performance Metrics

Number of staff that complete the class, and offering enough courses each year to meet demand (training form 4141's). Another measurement will be the course evaluation ratings. Also, the speakers must review before each course to keep content fresh, up-to-date, and respond to attendee questions/feedback.

Customers:

Primarily DWR Staff

Funding Information:

Project Budget (Annual):	\$25,000	Funding Source:	
Budget Notes:			
Project Start Date:	2011	Project End Date:	ongoing

External Partners:

DWR Training Center, the State Climatologist Office, the Bay-Delta Modeling Group, the State Water Project Power and Risk Office, and the Division of Flood Management.

2016 Project Accomplishments

In 2016, 2 classes were held in the training center, with 25 attendees on May 13, and 26 on October 6. Also, a jeopardy game was expanded and taken "on the road" to the Environmental Scientists workshop on October 11.

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

O I. Develop and Improve Communication, Outreach and Education on Climate Change
O III: Integrate Climate Change into DWR's Programs and Activities

IWM Business Categories

Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

N/A

Safeguarding California Implementation Plan

Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

N/A

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Economic Analysis Guidebook

Sponsor/Program Manager	To be determined
Project Manager	Emmanuel Asinas

Project Status:

Project Initiation Only

Project Objective:

To incorporate a full life cycle accounting of costs in economic analysis in consideration of climate change impacts

Project Description:

This work is part of the overall goal of updating the DWR Economic Analysis Guidebook in view of recent developments in state and federal policy mandates (e.g. Governor's Executive Order B-30-15), guidelines, and procedures, and new methods for conducting economic analysis that account for climate change risks and other extreme events.

Project Deliverables/Timeline

Still to be developed, but may include

1. Literature review of life cycle cost accounting
2. Full life cycle cost accounting spreadsheet tool
3. Updated DWR Economic Analysis Guidebook.

Success Determination - Performance Metrics

- 1) Report describing review of literature of life cycle cost accounting, life cycle benefit-cost analysis and related topics;
- 2) Life Cycle Benefit-Cost Analysis (Life Cycle BCA) tool that incorporates all benefits and costs throughout the life span of an activity (e.g. project or investment); and
- 3) Updated DWR Economic Analysis Guidebook that have been finalized and completed through rigorous review and approval process.

Customers:

DWR executives, program managers, specialists, grants and loans project applicants, the public and other concerned stakeholders.

Funding Information:

Project Budget (Total):	\$200,000	Funding Source:	We are looking for sponsor/s to fund this project
Budget Notes:	Budget will include costs associated with consultant and/or staff time and project deliverables.		
Project Start Date:		Project End Date:	

External Partners:

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2016 Project Accomplishments

The project team (Economic Analysis Section staff) has developed a generic Microsoft Excel based benefit-cost analysis tool designed for real world applications of Benefit-Cost Analysis (BCA). This tool can be used to look at the life cycle benefits and costs of projects, investments and other activities. Users can construct a BCA by entering a series of benefits and costs into a Microsoft Excel spreadsheet template. Users can enter one-off benefits and costs, as well as benefits and costs occurring over multiple years. In addition, users can calculate net benefits from time-savings, determine valuations for the environment, and calculate values for the net benefits associated with life savings. Users can also calculate a horizon value for their BCA. The tool produces results automatically. Each of the separate elements can be found on separate tabs within the Excel Template, allowing the user easy navigation through the different elements of the BCA. A draft instruction manual provides users with detailed instructions on how to use the tool.

Annual Reporting Category before 2015

N/A

Climate Change Objectives

- ☐ III: Integrate Climate Change into DWR's Programs and Activities
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- ☐ V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research
- ☐ VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Achieve the Co ~~Detail~~ Detail Goals for the
Protect and Restore Important Ecosystems
Manage and Prepare for Dry Periods
Expand Water Storage Capacity and Improve Groundwater Management
Increase Operational and Regulatory Efficiency

Safeguarding California Implementation Plan

Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Protect and Restore Water Resources for Important Ecosystems
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Emissions Reports to the California Air Resources Board (CARB)

Sponsor/Program Manager	Ghassan Alqaser
Project Manager	Ram Verma

Project Status:

On Going

Project Objective:

Reporting of Greenhouse Gas (GHG) emissions.

Project Description:

Reporting of Greenhouse Gas (GHG) emissions.

Project Deliverables/Timeline**Current Objectives:**

1. Compliance with mandatory reporting requirements of AB32
2. Monitoring of emissions and inventory of SF6

Future Objectives:

1. Tracking and reducing SF6 emissions

Tangible results that will result from the project:

1. Compliance with AB32 regulation
2. Optimized compliance cost
3. Reduced SF6 emission
4. Availability of SF6 emission reports

Success Determination - Performance Metrics

Reporting deadline and emission limits.

Customers:

Public, CARB and State Water Contractors

Funding Information:

Project Budget (Annual):	\$200,000	Funding Source:	SWC
Budget Notes:	The budget is mostly staff time and travelling to the Field Divisions.		
Project Start Date:	2013	Project End Date:	

External Partners:

California Air Resources Board

2016 Project Accomplishments

In 2016, DWR reported its 2015 pump load and generation data to CARB. DWR purchased compliance instruments to meet its contractual obligation for the Lodi Energy Center.

In May 2016, DWR submitted its annual report to the CARB for the emission year 2015. The report included energy generated and consumed by the SWP, and SF6 emissions associated with the SWP's switchyard circuit breakers. To meet its contractual obligation for the Lodi Energy Center, DWR participated in GHG allowance auctions conducted by CARB.

DWR complied with the reporting deadlines as the as the emission limits required by the regulations

Annual Reporting Category before 2015

Energy & Greenhouse Gas Emissions

Climate Change Objectives

O III: Integrate Climate Change into DWR's Programs and Activities

IWM Business Categories

Ensuring Reliable Water Supply for All Californians

Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

N/A

Safeguarding California Implementation Plan

N/A

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions

EO B-30-15: GHG Emissions Reduction 40% below 1990 levels by 2030, 80% below 1990 levels by 2050

EO B-30-15: State Agencies Implement GHG reductions

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Environmental Stewardship Policy

Sponsor/Program Manager

Executive

Project Manager

Ted Frink

Project Status:

On Going

Project Objective:

Implementation of the Environmental Stewardship Policy in DWR programs and projects. DWR shall implement the environmental stewardship policy through a commitment to manage and protect natural resources (water, air, land, plants and animals) and ecosystems in a sustainable manner that ensures they are available for future generations in consideration of climate change.

Project Description:

In October 2010 DWR's Director Mark Cowin established the inaugural Environmental Stewardship Policy. This policy is integral to advancing a Department-wide "Total Resource Management" approach to planning and design of projects. It sets forth the intent that DWR shall work towards the sustainability of public trust resources related to water resources management and the environment including strategies to address climate change impacts. The Policy states that DWR shall fully integrate environmental benefits, which include, but are not limited to, habitat protection and restoration/enhancement objectives and climate change adaptation in the planning, development, and implementation of operations, maintenance, and all projects under the authority of DWR. The Environmental Stewardship Policy commits DWR managers to consider, integrate, and design environmental stewardship attributes into DWR's water and flood management programs and projects in several ways: integrate ecosystem protection and restoration into water storage and conveyance and flood control/management planning and implementation; include environmental stewardship and ecosystem protection and restoration as criteria in project funding decisions for all DWR programs; plan for conservation, restoration and maintenance of the biological diversity and natural physical processes of aquatic and related terrestrial ecosystems; and plan and implement projects that contribute to the recovery of aquatic and riparian species listed under the federal and state Endangered Species Acts and other laws, as well as other at-risk species. In March 2012, the revised WREM 58b: Environmental Stewardship and Compliance was adopted. It provides guidance for consideration and application of Environmental Stewardship Principles along with project-level guidelines to improve DWR's ability to meet or exceed environmental compliance requirements.

Following the adoption of WREM 58b, the Environmental Stewardship Implementation Plan Work Group (ESIP) has begun development of an Environmental Stewardship Implementation Plan. The Plan will focus on developing education, outreach, and guidance on integrating Environmental Stewardship concepts and principles into all facets of DWR programs and projects. The ESIP Team has initiated the establishment of individual work teams for each of five identified areas of need for implementing the ES Policy throughout DWR programs. The five areas include Resources, Technical Assistance, Monitoring, Education and Training, and Communication and Outreach plans. The Plan will be completed in three phases. In Phase 1, initiated in 2014, the ESIP work teams will develop the scope, schedule, and budget needed to carry out the Plan. The development and implementation of the full Plan will occur in Phases 2 and 3, respectively. The outcomes of the project are expected to help advance environmental stewardship and sustainability objectives for public trust resources and the State's water management infrastructure by following the Director's Total Resource Management approach.

Project Deliverables/Timeline

The ESIPP workgroup was formed and Phase 1 of the Environmental Stewardship Implementation Plan Project was to be completed by mid-2015.

Project was put on hold by Executive in 2015. No further action has been taken by Executive to reinstate the Project to complete the products that were identified in the Charter.

Success Determination - Performance Metrics

1) Chief Deputy Director/Director approval to release the Environmental Stewardship Guidebook in 2017 to DWR.

No additional performance metrics are developed/identified until the re-initiation of the ESIPP Project is approved by ECC and Executive. No timeline has been established for this by ECC Executive Committee as of 4/2017.

Customers:

DWR managers and staff, public trust resources and general public, resources and regulatory agencies.

Funding Information:

Project Budget (Total):	\$200,000	Funding Source:	Individual Division funds
Budget Notes:	Budget was set as a commitment from each DWR Division to support staff that had been identified to be a representative to the ESIPP Team based on the Charter approved by all levels of Executive. The budget was the amount of staff time to work on the ESIPP over approximately 18 months.		
Project Start Date:	July 2014	Project End Date:	In Progress

External Partners:

N/A

2016 Project Accomplishments

The Environmental Stewardship Guidebook and Appendix has been re-reviewed & edited by a subteam of the ECC. The new draft Guidebook will be vetted/reviewed through the ECC Steering Committee and Executive Committee for final approval and posting/distribution to DWR, most likely in 2017.

Annual Reporting Category before 2015

Business Practices & Technical Expertise

Climate Change Objectives

- I. Develop and Improve Communication, Outreach and Education on Climate Change
- III: Integrate Climate Change into DWR's Programs and Activities
- IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Managing Floodwaters while Protecting the Ecosystem
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Make Conservation a California Way of Life
Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Achieve the Co -Equal Goals for the Delta
Protect and Restore Important Ecosystems
Manage and Prepare for Dry Periods
Expand Water Storage Capacity and Improve Groundwater Management
Provide Safe Water for All Communities
Increase Flood Protection
Increase Operational and Regulatory Efficiency

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Support Regional Groundwater Management for Drought Resiliency
Diversify Local Supplies and Increase Water Use Efficiency
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Utilize Low-impact Development and Other Methods in State and Regional Stormwater Permits to Restore the Natural Hydrograph
Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each Reinforces Sustainable Development That is Resilient to Climate Changes
Protect and Restore Water Resources for Important Ecosystems
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions
EO B-30-15: State Agencies Implement GHG reductions
EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure
SGMA
IRWM
UWMP
California Water Code for California Water Plan

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Evaluation of Benefits of Reoperation of Water Supply and Flood Protection Systems

Sponsor/Program Manager	Ajay Goyal
Project Manager	Sean Sou

Project Status:

On Going

Project Objective:

Improve water supply reliability and flood protection, and ecosystem restoration and protection

Project Description:

The California Department of Water Resources (DWR) is conducting a system reoperation study (SRS) in cooperation with other State and federal agencies, local water districts, groundwater managers, and other stakeholders, to identify potential strategies for reoperation of the statewide flood protection and water supply systems. The opportunity to reoperate portions of California's statewide water system to yield increased water resources-related benefits was recognized by the State Legislature in Senate Bill X2 1 (SB X2 1) (Perata, 2008 – Water Code Section 83002.5). In support of the legislative objectives, DWR developed the SRS to identify viable reoperation strategies and understand how integrated management can:

- Improve the reliability of municipal and irrigation water supply
- Reduce flood hazards
- Restore and protect ecosystem function and habitat conditions
- Buffer the hydrologic variations expected from climate change
- Improve water quality

Development of the SRS is a multi-phased effort that includes:

Phase 1 – Plan of Study – Completed 2011

Phase 2 – Strategy Formulation and Refinement - Completed 2013

Phase 3 – Preliminary Assessments of Strategies – Completed in 2016

Next Phase - The next phase of SRS will consist of evaluation of the reoperation of reservoirs to support enhanced ecosystem flows, to support sustainable groundwater management, to obtain additional benefits with integration of potential new reservoirs that may be funded by Proposition 1, and to obtain expanded benefits with potential new Sacramento-San Joaquin Delta (Delta) conveyance associated with California WaterFix.

The system reoperation strategies are analyzed with appropriate climate change scenarios and evaluated for their ability to reduce or minimize climate change impacts to water supply, flood management, and the ecosystem. System reoperation which involves primarily the use of existing water storage infrastructure and conveyance systems, such as conjunctive use of surface water and groundwater, could help reduce climate change impacts including reduced snowpack, more precipitation in the form of rain, and early snowmelt.

Project Deliverables/Timeline

Phase III Report: Assessment of Reoperation Strategies Planned completed in 2016

Next Phase: Reports for assessments of reoperation strategies with potential new water storage projects and new Delta conveyance to be completed in 2017 through 2019.

Success Determination - Performance Metrics

The Phase III Report concluded that re-operating the state's existing water systems provided limited benefits to water supply, flood control, and ecosystem. Analytical framework and tools/models to guide the formulation and evaluation of various combinations of reoperation strategies for the Phase III Report. The information, analytical framework, and tools/models developed for the Phase III Report can be applied by water agencies and water system owners and operators to formulate and evaluate the reoperation of their reservoirs.

Customers:

General Public, California Legislature, Water management facilities owners and operators

Funding Information:

Project Budget (Total):	\$10,000,000	Funding Source:	Prop. 84
Budget Notes:			
Project Start Date:	2010	Project End Date:	2019

External Partners:

N/A

2016 Project Accomplishments

Completed Draft of the Phase III Report Assessment of Reoperation Strategies

Annual Reporting Category before 2015

Operations

Climate Change Objectives

O III: Integrate Climate Change into DWR's Programs and Activities

IWM Business Categories

Ensuring Reliable Water Supply for All Californians

State Water Project Related?

Yes

Governor's Water Action Plan

Achieve the Co
Increase Flood Protection

-Equal Goals for the Delta

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Exhibits

Sponsor/Program Manager

John Andrew, DWR Public Affairs Office

Project Manager

Elissa Lynn

Project Status:

On Going

Project Objective:

The goal is to develop exhibit material for DWR or external facilities to educate the public about impacts of climate change on water and DWR operations. Objectives include the following: (1) coordinate with the Public Affairs Office on revamping existing exhibits; (2) coordinate with the Public Affairs Office to identify suitable locations for new exhibits and develop material for those sites

Project Description:

Public climate change display materials are to be developed for DWR Visitors' Centers and potential external locations.

Project Deliverables/Timeline

Deliverables Completed:

2007 Science On a Sphere, California State Fair, winner of the Government Communicators Award

2011 (Oct) Aquarium of the Pacific, Long Beach with shortened version of Climate of Change video; still in place through 2015, no changes until they remove display.

Buena Vista Museum of Natural History and Science in Bakersfield; still in place through 2015, no changes until they remove display.

2013: Fossil Discovery Center (FDC) climate change exhibit, Partners are FDC and DWR. The FDC displays some of the 15,000+ fossils that have been excavated from the Madera landfill site since 1996, when a Columbian Mammoth tusk was found during earthmoving. The climate change exhibit ties the themes of water and climatic changes to the abundance and diversity of species found in this region historically, as well as the challenges we face in the future due to a declining snowpack and changing hydrology. Still in place through 2015, no changes until they remove display.

Deliverables for 2016

CC vulnerabilities by region posters to Public Affairs to replace outdated posters at the Visitors' Centers. Climate Change Program staff to meet and collaborate with Public Affairs. Public Affairs staff attended Climate Literacy.

Deliverables to come:

Support the re-vamp of DWR Visitors' Centers displays related to climate change, under the direction of Public Affairs, on their timeline.

Possible deliverable: climate change video on the spherical globe at Vista del Lago.

No new "non-DWR" (external) sites or partnerships are currently planned, but could be created.

Success Determination - Performance Metrics

Peer-reviewed outreach materials displayed for the public, by meeting both budget and program objectives. Number of visitors engaged.

Customers:

Public

Funding Information:

Project Budget (Annual):	\$31,280	Funding Source:	Prop 84 (15/16), GF 16/17
Budget Notes:	Public Affairs will cover the cost to VC remodels, beyond the posters CC program has been providing. Headquarters cost = \$15,000 SRO staff cost = \$11,000 SCRO staff cost = \$1,280		
Project Start Date:	2011	Project End Date:	Ongoing

External Partners:

DWR Public Affairs Office, Fossil Discovery Center, Long Beach Aquarium, Buena Vista Museum of Natural History and Science in Bakersfield.

2016 Project Accomplishments

California Climate Change Vulnerabilities by Region posters were provided to DWR's Office of Public Affairs to replace outdated posters at the Visitors' Centers. Climate Change Program staff also met with the Public Affairs staff to gain insight on what was needed to better communicate with the public. In turn, the Public Affairs staff attended the Climate Literacy classes for both training in the subject matter, as well as providing feedback. Also, positive public feedback has been received with the DWR exhibits that have continued at the Aquarium of the Pacific in Long Beach and the Buena Vista Museum of Natural History and Science in Bakersfield.

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

☐ I. Develop and Improve Communication, Outreach and Education on Climate Change

IWM Business Categories

Ensuring Reliable Water Supply for All Californians

State Water Project Related?

No

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government

Safeguarding California Implementation Plan

Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

IRWM

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Flood Investment Strategy

Sponsor/Program Manager

DFM- Michael Mierzwa

Project Manager

Ricardo Pineda / Jason Sidley

Project Status:

On Going

Project Objective:

Address flood risk management in the context of integrated water management, and include recommendations for state investments that consider existing and changed conditions.

Project Description:

As part of Safeguarding Implementation Plan under EO-B-30-15, flood investment strategies should consider

* Local, State and federal agency proposed flood management project needs.

* Potential management actions to address flood risk and climate change to balance risk and reward on floodplains.

*How climate change and sea-level rise affect flood risk, and how flood risk is understood by the public.

Project Deliverables/Timeline

The anticipated completion date for the Investing in California's Flood Future document is Fall 2017. The various associated technical attachments will be completed in the same time frame.

Success Determination - Performance Metrics

Completion of the "Investing in California's Flood Futures" and beginning the implementation of the plans recommendations by state and local agencies. Success will be marked by the establishment of new funding and financing sources that can be used to plan, design, construct and update existing and new flood risk reduction infrastructure.

Customers:

Cities, counties, local flood control agencies and regional flood control agencies.

Funding Information:

Project Budget (Total):	\$10,000,000	Funding Source:	Proposition 1E and Proposition 84
Budget Notes:	TBD		
Project Start Date:	2011	Project End Date:	2017 for the current phase

External Partners:

United States Army Corps of Engineers, Floodplain Management Association, Federal Emergency Management Agency and California Office of Emergency Services.

2016 Project Accomplishments

The Statewide Flood Management Planning (SFMP) Program is working on a follow-up to the California's Flood Future report, which is entitled Investing in California's Flood Future: An Outcome-Driven Approach to Flood Management. This report will provide a framework for an outcome-driven approach to flood and water management as well as recommendations for prioritized actions to improve governance, funding, and remove obstacles to flood management actions. Additionally, this report will provide a strategy for how the State may fund these actions. The report is intended to guide local, State, and Federal decisions about policies and financial investments to provide for California's societal values, which are defined as public health and safety, a healthy economy, ecosystem vitality, and opportunities for enriching experiences. Several detailed technical attachments are being developed to support this report. These attachments focus on specific challenges facing flood management (i.e., flood risk awareness, regional flood management needs, agency alignment, funding mechanisms, and regulatory compliance). As part of the SFMP effort, DWR has coordinated with over 240 flood and water management agencies, the US Army Corps of Engineers, as well as regional and technical organizations, such as CEAC, CHARG, FMA, and BAFPAA.

Annual Reporting Category before 2015

N/A

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O II: Tribal Engagement on Climate Change
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels

IWM Business Categories

Building Capacity for Regional Sustainability
Managing Floodwaters while Protecting the Ecosystem
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Increase Flood Protection
Identify Sustainable and Integrated Financing Opportunities

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding

Legislative and Gubernatorial Mandates

EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Flood Preparedness Cooperation with CalOES

Sponsor/Program Manager

DFM- Eric Koch

Project Manager

Ricardo Pineda / STEPHEN COWDIN@WATER.CA.GOV

Project Status:

On Going

Project Objective:

Ensure optimal interagency coordination with the California Office of Emergency Services for development of the State Multi Hazard Plan Update for 2018 and optimal coordination during state declared flood emergencies and other emergencies regarding water infrastructure, water supply and dam safety.

Project Description:

DWR assists CalOES in the development of the federal government required State Multi-Hazard Plan. The previous MHP was completed in 2013 and CalOES is currently working on the 2018 MHP. DWR serves as the subject matter experts for riverine and alluvial fan flood risks, sea level rise, flooding due to levee failures and flooding due to dam failures. DWR provides CalOES written and graphical products including GIS based datasets for inclusion in the 2013 and currently under development 2018 State Multi-Hazard Plan.

DWR also coordinates with OES during flood emergency response through the State Emergency Management System-National Incident Management System-Incident Command System (SEMS-NIMS-ICS). DWR collaborates with CalOES for FEMA grants including Pre-Disaster Mitigation grants, Hazard Mitigation Grant Program grants and Flood Mitigation Assistance grants.

Project Deliverables/Timeline

By late spring/early summer 2017, DWR will provide updated text, maps and GIS products to CalOES related to riverine flood risks, alluvial fan flood risks, sea level rise, levee failure flood risk and dam failure flood risks. Completed applications for flood mitigation projects via FEMA PDM, HMGP and FMA grant programs. Successful support of CalOES during flood emergencies via SEMS-NIMS-ICS.

Success Determination - Performance Metrics

Successful completion of the 2018 California State Multi-hazard Plan including its submission to the Federal Emergency Management Agency and approval as an enhanced plan. FEMA considered the 2013 California Multi-Hazard Plan the most advanced plan in the United States. Completed applications for flood mitigation projects via FEMA PDM, HMGP and FMA grant programs. Successful support of CalOES during flood emergencies via SEMS-NIMS-ICS.

Customers:

State agencies, Federal Emergency Management Agency, United States Army Corps of Engineers, cities, counties, state governments, and foreign governments (for use as a model multi hazard study). Cities and counties for flood mitigation grant projects. State agencies, cities and counties for emergency response.

Funding Information:

Project Budget (Annual):	\$128,000	Funding Source:	1E and GF (see notes)
Budget Notes:	DFM uses combination of Prop 1E and General Funds to cover staff time for this project (no direct funds for this activity). During flood emergencies, funds are made available for flood emergency response to support SEMS_NIMS_ICs activities.		
Project Start Date:	ongoing	Project End Date:	ongoing

External Partners:

CalOES, State agencies, Federal Emergency Management Agency, California State University San Luis Obispo

2016 Project Accomplishments

Development of new information on statewide flood risks and related datasets including GIS products. Support the Statewide drought declarations in cooperation with CalOES,

Annual Reporting Category before 2015

Field Studies

Climate Change Objectives

O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels

IWM Business Categories

Managing Floodwaters while Protecting the Ecosystem
Taking Action to Reduce Residual Risk

State Water Project Related?

No

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Increase Flood Protection

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding

Legislative and Gubernatorial Mandates

EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Greenhouse Gas Emissions Reduction Plan - Monitoring and Tracking of Implementation

Sponsor/Program Manager	Andrew Schwarz, Katy Spanos, Heidi Rooks
Project Manager	Andrew Schwarz

Project Status:

On Going

Project Objective:

Monitor and track implementation of DWR Greenhouse Gas Emissions Reduction Plan to meet the commitments laid out in the Plan and ensure that DWR is on course to meet its GHG emissions reduction goals.

Project Description:

With the adoption of the DWR Greenhouse Gas Emissions Reduction Plan (GGERP) on May 24th, 2012 DWR committed to substantial GHG emissions reduction goals (Near-term: Reduce GHG emissions to 50% below 1990 levels by 2020; Long-term: Reduce GHG emissions to 80% below 1990 levels by 2050). DWR also committed to annual tracking and reporting of GHG emissions and a quinquennial review of progress toward achievement of goals and re-evaluation of GHG emissions reduction strategies if necessary.

Project Deliverables/Timeline

On-going monitoring and reporting of DWR GHG emissions consistent with the GGERP each year, Quinquennial evaluation of progress toward meeting GGERP GHG emissions reduction goals.

Success Determination - Performance Metrics

GHG emissions reductions and progress toward achievement of GHG emissions reduction goals are tracked and reported on an annual basis and annual reports are posted to DWR's website.

Customers:

DWR Executive Management, State of California, Public, State Water Project Contractors

Funding Information:

Project Budget (Annual):	\$20,000	Funding Source:	N/A
Budget Notes:			
Project Start Date:	2012	Project End Date:	On-going through 2050

External Partners:

The Climate Registry

2016 Project Accomplishments

In 2016, DWR calculated and verified GHG emissions for 2015. 2015 Emissions were 52% below 1990 levels and 37% below 2010 levels. Thus, effectively achieving the 2020 emissions reduction target (50% below 1990 levels and 33% below 2010 levels by 2020) five years early.

Annual Reporting Category before 2015

Energy & Greenhouse Gas Emissions

Climate Change Objectives

O VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

N/A

Safeguarding California Implementation Plan

Diversify Local Supplies and Increase Water Use Efficiency

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions
EO B-30-15: GHG Emissions Reduction 40% below 1990 levels by 2030, 80% below 1990 levels by 2050
EO B-30-15: State Agencies Implement GHG reductions
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure
EO B-18-12: Reduce Agency GHG Emissions by 10% by 2015 and 20% by 2020 from 2010 Baseline
EO B-18-12: Zero Net Energy Buildings
EO B-18-12: LEED Silver
EO B-18-12: Electric Vehicle Charging Stations

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Hydroclimate Report

Sponsor/Program Manager

State Climatologist Office

Project Manager

Peter Coombe / Michael L Anderson

Project Status:

On Going

Project Objective:

To improve annual reporting of current hydroclimate conditions, and meet the objectives set by EO-B-30-15, an annual hydroclimate bulletin will give historical context to water conditions.

Project Description:

Following on the efforts of the National Climate Assessment and the California Climate Change Indicators Report, the DWR Hydroclimate Report will document characteristics of a changing climate on California's water resources. By tracking change through a collection of indicators on an annual basis, it is hoped that transitions of past important thresholds can be better anticipated enabling the continued refinement of adaptation strategies.

This report includes key indicators for hydrology and climate in California and will be updated annually with the newest available data to track important trends, provide a compilation of indicators, and provide graphical visualization of data trends that are of interest to water managers, the media, State government, and the research community. Key indicators in the Hydroclimate Report include temperature, precipitation, snowpack, streamflow, rain/snow ratios, atmospheric rivers, and sea level.

Project Deliverables/Timeline

(2016-2017) Final 2015 Water Year Hydroclimate Report release, Water Year 2016 Hydroclimate Report to be updated and released by December 2016.

Hydroclimate report will be updated annually at the beginning of each water year.

Success Determination - Performance Metrics

Annual publication of the Hydroclimate Report after the end of the Water Year.

Customers:

Water managers, the media, State government, and the research community.

Funding Information:

Project Budget (Annual):	\$50,000	Funding Source:	Prop 84
Budget Notes:			
Project Start Date:	1/5/2015	Project End Date:	

External Partners:

WRCC, California Cooperative Snow Surveys, CAL EPA, NOAA

2016 Project Accomplishments

Project accomplishments for 2016 included the release of the first DWR California Hydroclimate Report for the Water Year 2015. The report includes climate tracking indicators such as precipitation, temperature, snowpack, and streamflow in order to visualize long term climate trends. Content was developed for the Water Year 2016 report which will include additional indicators such as Atmospheric Rivers and Water Year Type.

Annual Reporting Category before 2015

Planning, Modeling, and Data Collection

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O III: Integrate Climate Change into DWR's Programs and Activities
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Taking Action to Reduce Residual Risk

State Water Project Related?

Yes

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Manage and Prepare for Dry Periods
Increase Flood Protection

Safeguarding California Implementation Plan

Support Regional Groundwater Management for Drought Resiliency
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure
EO S-13-08: NRC SLR Study

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Integrated Regional Water Management Grant Program

Sponsor/Program Manager	Muzaffar Eusuff
Project Manager	Muzaffar Eusuff / Theodore Daum

Project Status:

On Going

Project Objective:

Projects funded by IRWM funding expect to achieve the following:

- Sustainable water management – developing estimates for water supply yield, water savings, improved water quality, etc.
- All IRWM Plans will be updated to 2016 Grant Program planning standards
- More collaborative water management
- Improved integration of projects
- IRWM Plans consider Climate Change vulnerability adaptation
- Project selection considers mitigation of greenhouse gas emissions

Project Description:

The IRWM Grant Programs provide financial assistance in a manner that:

- Results in optimal investment of state funding providing maximum benefit to the State's people and environment through improved local and regional water management
- Is transparent and provides for engagement by partner agencies, interest-based stakeholders, and the public on program development and implementation
- Is consistent with legal, legislative, and DWR policy requirements for each funding source

Project Deliverables/Timeline

Current program schedule: <http://www.water.ca.gov/irwm/grants/programschedule.cfm>

Success Determination - Performance Metrics

Funds allocated per proposition requirements
Completion of solicitation cycle by target date funds awarded and encumbered
Project deliverables achieved

Customers:

49 RWMGs supporting individual IRWM regions which includes a variety of local and regional water/flood management agencies, land use agencies, state and federal agencies, non-governmental organizations, and tribal entities.

Funding Information:

Project Budget (Total):	\$1,364,000,000	Funding Source:	Propositions 50, 84 and Proposition 1 Planning and Disadvantaged Community Involvement Program
Budget Notes:	All Proposition 50 and 84 funds are awarded. Total authorized funding \$1.31B. Funds are appropriated to allow for reimbursements. \$510 million are available for Proposition 1 grant programs. In 2016 \$4.2 million was awarded for Planning Grant program and \$51 Million for DAC program.		
Project Start Date:	November 2002	Project End Date:	December 2021

External Partners:

The IRWM grant program is solely administered by DWR. However, in order to deliver the program we work with a variety of state agencies along with 48 Regional Water Management Groups (RWMGs) supporting individual IRWM regions.

2016 Project Accomplishments

The main activities for IRWM this year were managing existing agreements and executing the 2015 Proposition 84 Implementation agreements. All Proposition 50 grant funded activities are now completed and the program is now officially closed. The Proposition 1 Planning solicitation was conducted with \$4.2 million in funds awarded to 15 Regional Water Management groups to update or develop IRWM plans to 2016 standards. The Proposition 1 Disadvantaged Community Involvement Program solicitation was conducted and \$51 million in grant funds were awarded to 12 DACI funding areas.

Annual Reporting Category before 2015

Grant making & Technical Assistance

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O II: Tribal Engagement on Climate Change
- O III: Integrate Climate Change into DWR's Programs and Activities
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research
- O VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Managing Floodwaters while Protecting the Ecosystem
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life
Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Achieve the Co -Equal Goals for the Delta
Protect and Restore Important Ecosystems
Manage and Prepare for Dry Periods
Expand Water Storage Capacity and Improve Groundwater Management
Provide Safe Water for All Communities
Increase Flood Protection
Increase Operational and Regulatory Efficiency
Identify Sustainable and Integrated Financing Opportunities

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Support Regional Groundwater Management for Drought Resiliency
Diversify Local Supplies and Increase Water Use Efficiency
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Utilize Low-impact Development and Other Methods in State and Regional Stormwater Permits to Restore the Natural Hydrograph
Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each Reinforces Sustainable Development That is Resilient to Climate Changes
Protect and Restore Water Resources for Important Ecosystems
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions
EO B-30-15: GHG Emissions Reduction 40% below 1990 levels by 2030, 80% below 1990 levels by 2050
EO B-30-15: State Agencies Implement GHG reductions
EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure
SGMA
IRWM
UWMP
California Water Code for California Water Plan

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Integrated Resource Plan for the State Water Project

Sponsor/Program Manager

Ghassan ALQaser

Project Manager

Cheryl Luu

Project Status:

On Going

Project Objective:

A 20 year resourcing plan (updated every 3 years) under which the long-term energy needs of the State Water Project's (SWP) would be met.

Project Description:

The Integrated Resource Plan (IRP) is a resourcing plan outlining strategies under which the long-term energy needs of the State Water Project's (SWP) would be met. The IRP considers a balanced approach to meeting the operational, economic, and policy needs of the SWP's water delivery requirements. The IRP's procurement plan will keep SWP's Power Portfolio consistent with the GHG reduction goals outlined in DWR's Climate Action Plan which incorporates the Governor's Executive Order S-03-05 and AB 32.

In developing the IRP, DWR considers numerous operational and regulatory constraints and objectives. The SWP is committed to:

- Protecting human safety, property, and natural environment
- Sustaining reliable water deliveries;
- Sustaining efficient and affordable water deliveries;
- Performing responsibilities under regulatory authorities; and
- Complying with State and Federal environmental policy goals.

Project Deliverables/Timeline

Update to the IRP is planned to be completed in Spring of 2017.

Initiate standard block purchases recommended in IRP16 through incremental portfolio purchases.

Continue participation in the power planning portion of Value Engineering Studies meant to manage reliability and efficiency improvements throughout the SWP.

Success Determination - Performance Metrics

Recommendations of a procurement plan to minimize SWP's energy costs based on projected market conditions and in accordance with CDWR risk management policies.

Customers:

State Water Contractors

Funding Information:

Project Budget (Annual):	\$460,000	Funding Source:	State Water Project
Budget Notes:			
Project Start Date:	2006	Project End Date:	In Progress

External Partners:

State Water Contractors

2016 Project Accomplishments

Developments for IRP16: •Conducted analysis on SWP's net open position under various water-transport scenarios. •Developed a series of strategies to hedge SWP's energy costs. •Evaluated the effectiveness, costs and risks of various forward contract products necessary to hedge the SWP portfolio based on historical market prices and historical operational scenarios.

Annual Reporting Category before 2015

Energy & Greenhouse Gas Emissions

Climate Change Objectives

O III: Integrate Climate Change into DWR's Programs and Activities
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IWM Business Categories

N/A

State Water Project Related?

Yes

Governor's Water Action Plan

N/A

Safeguarding California Implementation Plan

N/A

Legislative and Gubernatorial Mandates

N/A

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Integrating SLR into National Flood Insurance Program (NFIP)

Sponsor/Program Manager	Jeanine Jones
Project Manager	John Andrew

Project Status:

Complete

Project Objective:

To provide a non-regulatory approach in integrating sea-level-rise science into the National Flood Insurance Program (NFIP)

Project Description:

A grant from the National Oceanic and Atmospheric Administration's (NOAA) Coastal and Ocean Climate Applications (COCA) program was given to the California Ocean Science Trust (OST) and the Scripps Institution of Oceanography (Scripps). DWR initiated the grant process to secure the funding and worked with OST and Scripps as a cost share partner to take the sea-level-rise work from the National Research Council that DWR supported and apply it at the local level.

The grant was received in January 2014. DWR and its partners began the process that would assist local floodplain and coastal managers, DWR's Division of Flood Management (DFM), and local NFIP staff working at the regional offices of DWR. The project is intended to translate the science into on-the-ground applications. The Climate Change Program reached out to DFM, who joined the planning team.

A scoping group was formed to solicit recommendations on the formation of an advisory committee, known as the Focus Group, which would inform the principal investigators on the project the direction to take with the grant products. Initial work was focused on providing a Coastal Appendix to DWR's CA Quick Guide to the NFIP. With input from the Needs Assessment and Focus Group, the products were expanded to include a Technical Methods Manual and Comprehensive Report.

The work was advertised and promoted at the 2014, 2015, and 2016 annual conferences held by the Flood Management Association, a member of the Focus Group, as well as other venues.

Project Deliverables/Timeline

NOAA grant SLR-NFIP project (2014):

- Discuss with Cal-Adapt Technical Advisory Committee (February)
- Project summary page (April)
- Scoping meeting (May)
- Interview template for Needs Assessment (July)
- Focus Group - background informational webinar (September)
- Project poster developed by DWR's FloodSAFE and Climate Change Program staff and OST for Flood Management Association's Annual Conference in Santa Rosa (September) and also presented at DWR's Annual Environmental Scientist Workshop (October)
- First Focus Group meeting (October)
- Technical webinar hosted by FEMA (October)
- List of expectations of Coastal Quick Guide Appendix (November)
- Climate change staff presentation of climate change, flooding, and this project at DWR's class to floodplain managers on the NFIP in Oceanside (December)
- List of additional products for improved knowledge sharing: Technical Methods Manual and Comprehensive Report (December)

NOAA grant SLR-NFIP project (2015):

- Draft Needs Assessment (January)
- Advertise project in CHARG map project list (February)
- Final Needs Assessment titled "Sea-Level Rise and Floodplain Management in California: Understanding Information Needs, Challenges and Opportunities" and prepared by OST (March)
- Second Focus Group meeting (March)
- Draft outline of Coastal Quick Guide Appendix (March)
- Technical Methods Manual Committee Meeting #1 (April)
- Subsequent draft outlines of Coastal Quick Guide Appendix (April and May)
- Initial Draft of Coastal Quick Guide Appendix (May)
- Outline of Comprehensive Report (May)
- Third Focus Group meeting (June)
- Presentations at Coastal Future Conditions Workshop in Pacifica by OST and ESA on project (July)
- Subsequent drafts of Coastal Quick Guide Appendix (July, August, September)
- Technical Methods Manual Committee Meeting #2 (August)
- Initial draft of the Technical Methods Manual (August)
- Presentations at Flood Management Association's Annual Conference (September)
- Updated project poster developed by DWR's FloodSAFE and Climate Change Program staff and OST for Flood Management Association's Annual Conference in Rancho Mirage (September)
- Final Draft Coastal Appendix to Quick Guide from David Ford Consulting (October)
- Advertise project on Sea-Level Pilot Programs for Resilience on State's new web site (<http://storms.ca.gov/state-preparation/>) (October)
- Subsequent drafts of Technical Methods Manual from ESA (November, December)

NOAA grant SLR-NFIP project (2016):

- Presentation of Technical Methods Manual by ESA at Environmental Modelling Forum in Sacramento (April)
- Project summary to proposed Safeguarding California "Sneak Peek" report (May)
- Final Draft Technical Methods Manual to Technical Methods Manual Committee (May)
- Second Final Draft Technical Methods Manual (August)
- Final Draft Coastal Appendix to Quick Guide integrating additional comments from Focus Group and others (September)
- Draft Comprehensive Report (September)
- Presentation of Technical Methods Manual by ESA at Annual Floodplain Management Association Conference in Sacramento (September)
- Final Coastal Appendix to Quick Guide, Technical Methods Manual, and Comprehensive Report (October)
- Presentations within DFM on products (October)
- Finalized products, including presentations, on DWR webpage (December)
- Abstract on project poster to Climate Change Symposium (December)

NOAA grant SLR-NFIP project (2017):

- Final grant report and closure of NOAA grant by OST (January)
- Poster presentation on project at Climate Change Symposium in Sacramento (January)
- Summary of project and outcomes for annual Integrated Water Management Report (March)
- Presentation by DFM to the Matrix Team (April)
- Presentation by ESA on Technical Methods Manual at California Association of Environmental Professionals in San Francisco (May)

Success Determination - Performance Metrics

Completion of products (Quick Guide Coastal Appendix, Technical Methods Manual, Comprehensive Report) and posting them on the DWR website

Final products accessible

<http://www.water.ca.gov/floodmgmt/lra/mo/fmb/fas/nfip/cca.cfm>.

Customers:

local governments and regional groups

Funding Information:

Project Budget (Annual):	\$50,000	Funding Source:	Prop 84 (15/16), GF 16/17
Budget Notes:	<p>SRO: \$35,000/yr ~\$23,000 were 2014-15 & 2015-16 CC program contract funds. CC Program: \$15,000 contract funds (2015); ~\$8,000 (2016)</p> <p>For the NOAA grant support (Integrating SLR into non-regulatory aspects of NFIP):</p> <p>1. Coastal Quick Guide Appendix development - FloodSAFE Program Management Consulting Services, Contract No. 4600009146, Task Order No. 14-07; Contractor: GEI Consultants, Inc., Subcontractor: David Ford Consulting; \$132,356.63 (DFM funding)</p> <p>2a. Technical Methods Manual development - Contract No. 4600008950, Task Order No. 10-20; Contractor: CH2M HILL Engineers, Inc., Subcontractor: Environmental Science Associates (ESA); \$30,000.00 (split 50:50 between DFM and CC Program)</p> <p>2b. Technical Methods Manual additional analyses (task identified as Sea Level Rise Technical Methods Manual Updates) -Contract No. 4600010567, Task Order No. 29; Contractor: Environmental Science Associates (ESA); \$16,733.58 (split 50:50 between DFM and CC Program)</p> <p>Budget does not include DFM staff costs.</p>		
Project Start Date:	2014	Project End Date:	2016

External Partners:

NOAA, California Ocean Science Trust, Scripps Institution of Oceanography, DFM, and local, state, federal agencies involved with coastal planning.

Details: DWR-wide (including FloodSAFE) DWR-wide (including FloodSAFE); OPR, CDPH, Cal/EPA, CEC, Cal OES, SIO (UCD), BCDC, Coastal Commission, OPC, SCC; FEMA, NOAA, US ACOE; Local governments, CA OST, FMA.

2016 Project Accomplishments

Final products accessible

<http://www.water.ca.gov/floodmgmt/lrafm/fmb/fas/nfip/cca.cfm>.

Regional staff has been working with the CA Ocean Science Trust (OST) and Scripps Institution of Oceanography (SIO) on a National Oceanic and Atmospheric Administration (NOAA) grant-funded project, whereby DWR provided matching funds through in-kind services and monetary support. Staff from the Climate Change Program has served as DWR's principal investigator for the project since January 2014.

The project began in 2014 after the grant was awarded to OST and SIO. The pilot project (Piloting Non-Stationary Approaches to Floodplain Management: Supporting Local Communities and Informing National Policy) focuses on understanding local sea-level rise in context of other coastal processes to provide the science background in supporting adaptation strategies for the coastal regions.

Products, including Focus Group meeting summaries and Needs Assessment, are posted on OST's website at <http://www.oceansciencetrust.org/project/sea-level-rise-and-floodplain-management/>. As of December 2016, the products and presentations are posted on DWR's website at

<http://www.water.ca.gov/floodmgmt/lrafm/fmb/fas/nfip/cca.cfm>. The reports developed for the project include: "The National Flood Insurance Program in California - Quick Guide Coastal Appendix: Planning for Sea-Level Rise," "Relating Future Coastal Conditions to Existing FEMA Flood Hazard Maps: Technical Methods Manual," and the Comprehensive Report, titled "Addressing Sea Level Rise and Floodplain Management in California with the National Flood Insurance Program."

Refer to deliverables on specific 2016 accomplishments. Main items that were done in 2016 included finalization and approval by DWR of the Coastal Appendix to the CA Quick Guide to the National Flood Insurance Program, the Technical Methods Manual (TMM), and the Comprehensive Report. The TMM was presented by ESA in 2016 at the Environmental Modelling Forum in Folsom and at the annual Flood Management Association's Conference in Sacramento. In addition, the products were presented within Division of Flood Management, and a PowerPoint was finalized and posted on the web for public outreach.

Annual Reporting Category before 2015

N/A

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O III: Integrate Climate Change into DWR's Programs and Activities
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Building Capacity for Regional Sustainability
Managing Floodwaters while Protecting the Ecosystem
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Achieve the Co
-Equal Goals for the Delta
Increase Flood Protection
Increase Operational and Regulatory Efficiency

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each Reinforces Sustainable Development That is Resilient to Climate Changes
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO S-13-08: NRC SLR Study
SGMA
IRWM
UWMP
California Water Code for California Water Plan

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Investment and Planning for water-related climate impacts in Disadvantaged Communities

Sponsor/Program Manager

Climate change program with California Water Plan

Project Manager

Jose Alarcon

Project Status:

Complete

Project Objective:

To assist in integrating climate change concerns for disadvantaged communities

Project Description:

Project is focused on working with staff involved with the California Water Plan updates and also assists with climate change text and information to highlight State concerns and effects on communities where climate change might pose undue burden.

Project Deliverables/Timeline

2015: "Californians without Safe Water and Sanitation" report

2016: Official release of "Californians without Safe Water and Sanitation" report (Feb)

Success Determination - Performance Metrics**Customers:**

State and local agencies, Tribes

Funding Information:

Project Budget (Annual):	\$320	Funding Source:	Prop 84 (15/16), GF 16/17
Budget Notes:	SRO staff: \$11,000/yr (for previous years). 2015 reduced to \$320.		
Project Start Date:	2014	Project End Date:	

External Partners:

Within DWR: CA Water Plan staff

Outside DWR: State and local agencies, Tribal organizations, non-profit organizations

2016 Project Accomplishments

Regional staff (Lauma) no longer was involved with the CA Water Plan and associated DAC work in 2016.

Annual Reporting Category before 2015

N/A

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ II: Tribal Engagement on Climate Change
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Manage and Prepare for Dry Periods
Expand Water Storage Capacity and Improve Groundwater Management
Provide Safe Water for All Communities
Increase Flood Protection

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Support Regional Groundwater Management for Drought Resiliency
Diversify Local Supplies and Increase Water Use Efficiency
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

IRWM
California Water Code for California Water Plan

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Investment in Climate Adaptation for the Delta

Sponsor/Program Manager	Eco-Restore - Bill Harrell
Project Manager	Tim Smith / Charlotte Chorneau

Project Status:

Project Initiation Only

Project Objective:

Position DWR to work efficiently with California Natural Resources Agency and other State departments under the California Water Action Plan to coordinate habitat restoration activities and leverage efficient use of Prop 1 and other bond funds to meet DWR goals.

Project Description:

A program to provide DWR with a centralized location for coordination, communication, and integration of all habitat restoration planning and implementation efforts within the Department. Specifically, this program is focused on achieving a streamlined and efficient process when using resources, approving land acquisition for restoration, developing policy and issue resolution, coordinating unified communication and outreach efforts, and tracking progress on restoration projects.

Project Deliverables/Timeline

CA EcoRestore has a goal of breaking ground on the restoration of at least 30,000 acres in the Delta by 2020, including tidal wetlands, floodplain, riparian and upland habitats. DWR EcoRestore will support CA EcoRestore and the continuation to ensure that DWR restoration projects are well coordinated, including on modeling and approaches to address climate change factors.

Success Determination - Performance Metrics

For climate change - EcoRestore performance metrics will include:

- # of acres restored
- # of tidal wetlands created or protected
- # of miles of levees improved
- # acres devoted to carbon storage/carbon loss addressed
- # of acres of subsidence addressed

Customers:

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Funding Information:

Project Budget (Annual):	\$1,561,590	Funding Source:	SWP
Budget Notes:	Annual Budget for DWR EcoRestore Program		
Project Start Date:	5/29/2015	Project End Date:	None

External Partners:

California Natural Resources Agency, Delta Stewardship Council, Delta Conservancy, California Department of Fish and Wildlife

2016 Project Accomplishments

In 2016 EcoRestore made on the ground progress by breaking ground on 1 tidal restoration project of 600+ acres, and a fish passage improvement project in the Yolo Bypass. DWR released a first-of-its-kind Request for Proposals to seek additional tidal wetland projects to fund through partnerships. DWR acquired over 1,300 acres of land from willing sellers in the Delta for restoration.

All projects are taking climate change impacts into consideration and will be adaptively managed in accordance with the Delta Plan. Projects more focused on addressing climate change such as levee repairs and carbon sequestration will start construction by 2019. In 2017, the Southport Setback Levee project will start construction which will include the setback of nearly 6 miles of levees to address many concerns including sea level rise and climate change impacts.

Annual Reporting Category before 2015

Field Studies

Climate Change Objectives

- ☐ III: Integrate Climate Change into DWR's Programs and Activities
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Managing Floodwaters while Protecting the Ecosystem

State Water Project Related?

Yes

Governor's Water Action Plan

Achieve the Co -Equal Goals for the Delta
Protect and Restore Important Ecosystems

Safeguarding California Implementation Plan

Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Protect and Restore Water Resources for Important Ecosystems

Legislative and Gubernatorial Mandates

EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Investments in Flood Protection

Sponsor/Program Manager	DFM
Project Manager	Ricardo Pineda / Todd Bernardy

Project Status:

On Going

Project Objective:

Make investments to reduce flood risks statewide and in the facilities of the State Plan of Flood Control to reduce damage to property and loss of human life, while improving the ecosystem and providing enriching experiences including recreation and open space. The state investments will follow a statewide “water management effectiveness framework” which is the foundation of providing for investment in flood and water management. Statewide flood risk reduction investments will be consistent with the Financing Strategies described in Attachment 1 (Finance Strategies) of the November 2013 California Flood Futures Report. Investments to improve the function and resilience of the Central Valley State Plan of Flood Control will be guided by the statewide framework and the Central Valley Flood Protection Plan Investment Strategy and Financing Plan that will be completed as part of the 2017 update to the Central Valley Flood Protection Plan.

Project Description:

This project will develop a comprehensive investment strategy to implement the recommendations of the DWR 2013 report “California’s Flood Future: Recommendations for Managing the State’s Flood Risk.” A subset of this future statewide flood risk investment strategy will be the investment strategy being developed as part of the 2017 Update to the 2012 Central Valley Flood Protection Plan (CVFPP). The 2017 CVFPP Investment Strategy will include a Financing Plan. Once the statewide and Central Valley specific financing plans are developed, the plans will move towards implementation. Implementation will be reflected in DWR budget change proposals for capital outlay funds and general funds. The investment strategy and financing plans will be used by the State Legislature for the development of language supporting potential bond measures and federal project cost-sharing. The draft 2017 CVFPP Update and supporting documents are available for public review and will be considered for adoption by the Central Valley Flood Protection Board in late 2017. For decades, DWR has invested in flood risk reduction projects and flood risk reduction feasibility studies in the Central Valley and flood risk reduction projects outside the Central Valley. The statewide and Central Valley investment strategies and financing plans reflect a more effective and strategic spending plan for the future.

Project Deliverables/Timeline

Completion of the Statewide Flood Risk Investment Strategy and Central Valley Flood Protection Plan Investment Strategy is scheduled in 2017. On an annual basis, dependent on available funding, DWR makes investments in flood risk reduction projects and flood risk reduction planning studies that lead to projects. Each project or feasibility study has a distinct time frame and schedule and many projects and studies are ongoing and take many years to complete. The overarching 2017 Central Valley Flood Protection Plan Update is currently available in draft and is undergoing public review. The plan is expected to be adopted by the Central Valley Flood Protection Board in 2017. The 2017 CVFPP Update will serve as a guide for investments in flood protection.

Success Determination - Performance Metrics

Investments in Flood Protection will follow as close as possible the draft 2016 Flood Management Implementation Plan Update (June 2016). The Implementation Plan is updated every two to three years to reflect changes in project and study delivery schedules which are dependent on federal authorization, federal/state/local funding streams, and federal and state permitting. Each flood risk reduction project and flood risk reduction study has a unique implementation schedule and expenditure/financing plan. The 207 Central Valley Flood Protection Plan (currently draft) will take an estimated 30 years to implement.

Customers:

Central Valley Flood Protection Board, California Office of Emergency Services, United States Army Corps of Engineers, Federal Emergency Management Agency, cities, counties, local flood agencies and regional flood agencies.

Funding Information:

Project Budget (Total):	\$20,000,000,000	Funding Source:	Bonds
Budget Notes:	Draft 2017 CVFPP \$20 billion to capture the scale of the flood investments needed. We anticipate spending approximately \$830M over the next 5 years, but the flood improvement projects are going to take an estimated 30 years to complete. Since the CVFPP will be updated every five years and the cost estimate will reflect updated project delivery schedule in each CVFPP update.		
Project Start Date:	2015	Project End Date:	2045 (includes all the sub-projects under the Central Valley Flood Protection Plan)

External Partners:

Central Valley Flood Protection Board, California Office of Emergency Services, United States Army Corps of Engineers, Federal Emergency Management Agency, cities, counties, local flood agencies and regional flood agencies.

2016 Project Accomplishments

In Calendar year 2016, approximately \$92,365,605 in Proposition 1E bond funds were expended to deliver flood risk reduction projects, flood risk reduction studies (feasibility studies) and System wide flood system improvements. These expenditures supported projects in Butte County, Sutter County, Yolo County, Sacramento County and San Joaquin County.

Annual Reporting Category before 2015

N/A

Climate Change Objectives

- ☐ III: Integrate Climate Change into DWR's Programs and Activities
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels

IWM Business Categories

Managing Floodwaters while Protecting the Ecosystem
Taking Action to Reduce Residual Risk

State Water Project Related? Yes

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Achieve the Co -Equal Goals for the Delta
Protect and Restore Important Ecosystems
Increase Flood Protection

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding

Legislative and Gubernatorial Mandates

EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

K-12 Outreach

Sponsor/Program Manager

Elissa Lynn, John Andrew, and Director of Public Affairs

Project Manager

Elissa Lynn / Jennifer Morales

Project Status:

On Going

Project Objective:

The overall goal is to foster outreach and improve efficiency of resources by being a sustainability leader and providing direction to California's youth. The objectives are the following: (1) to investigate existing DWR efforts in working with other state agencies on public environmental education for K-12 classes; (2) to augment existing efforts to include climate literacy; and (3) to develop climate literacy presentations to be inserted into Project WET (Water Education for Teachers) workshops or other appropriate products, if identified.

Project Description:

Although California has been on the forefront in addressing climate change, understanding climate variabilities, human actions, and solutions may not be as evident at the local public level. Since a changing climate will more profoundly affect future generations, tools are needed to educate the younger generation on climate science and the choices they can make to prepare themselves for it. Because DWR declared its vision to be a sustainability leader, it can make a difference by being involved in the curriculum development for the state's students in the area of climate change and its effects on water management.

An approach is to investigate existing DWR efforts in working with other state agencies on public environmental education for K-12 classes and augment those efforts to include climate literacy. The project was intended to develop climate literacy modules for grades K-8 and for grades 9-12 to be inserted into Project WET (Water Education for Teachers) products or other appropriate products, if identified. However, since its original inception (labeled as "Climate Literacy K-12 Modules" in the original Project Initiation form and "K-12 curriculum and slides" in the Outreach and Education Report), the project now covers overall "K-12 Outreach" with Project WET climate change workshops now in its own category.

"K-12 Outreach" covers the areas where DWR is not the lead, rather a supporter. This would include presentations at non-DWR supported Project WET workshops, direct involvement with schools at events and as speakers, and judging at student science fairs to further the development of students in the field of science. There will be a need to collaborate more with the Public Affairs Office should we want to get more involved with actual curriculum development with the Department of Education, which may need its own project initiation form. And as indicated earlier, Project WET climate change workshops that are directly supported by DWR are now being addressed as its own item.

Project Deliverables/Timeline

DWR-sponsored Project WET climate change workshops:

2014 - two pilot workshops (Oroville and Visalia), April-May

2015 - four workshops (Los Angeles, Bishop, Redding, Fresno), April, June, and September

Rest to be covered under the "Project WET" category.

Participation in Project WET workshops (not sponsored by DWR, Climate Change Program):

2012 - Northern Region workshops

2013 - Northern Region workshops

2014 - Northern Region workshops

2015 - speaker on a combination bus tour and rolling Project WET workshop through the American River watershed

School presentations:

2011 -Thousand Oaks High School 2nd Annual Sustainability Summit, January, Thousand Oaks

- Fairfax High School Planeteers' Earth Day Event, April, Los Angeles

2012 - Dailey Elementary 2nd grade students, November, Fresno

2013 - Sunnyside High School AVID Program, February, Fresno

- Riverview Elementary, November, Fresno

- Mountain View Elementary 6th Grade, November, Fresno

2014 - Dailey Elementary 3rd Grade, May, Fresno

2015 - Fugman Elementary, May, Fresno

2016 - Kerman High School, April, Kerman

- Educators in Santa Clara Valley Water District, June, Santa Clara

- Tulare Office of Education Migrant Student Journalism Class, Woodward Park, December, Fresno

2017 - Sacramento Home-Schoolers, February, West Sacramento

Science Fairs:

2010 - California State Science Fair, May, Los Angeles (judge- junior environmental science category)

2011 - Sacramento Regional Science and Engineering Fair, March, Mather (judge- junior categories)

- California State Science Fair, May, Los Angeles (judge- junior environmental science category)

- Intel ISEF, May, Los Angeles (grand awards judge- environmental science category)

2012 - Sacramento Regional Science and Engineering Fair, March, Mather (judge- junior categories)

- California State Science Fair, May, Los Angeles (judge and chair- junior biological product science category)

2013 - Sacramento Regional Science and Engineering Fair, March, Mather (judge- junior categories)

- California State Science Fair, Apr, Los Angeles (judge and chair- junior biological product science category)

2014 - Sacramento Regional Science and Engineering Fair, March, Mather (judge- junior categories)

- California State Science Fair, April, Los Angeles (judge and chair- junior biological product science category)

-Intel ISEF, May, Los Angeles (grand awards judge- environmental management category)

2015 - California State Science Fair, May, Los Angeles (judge, chair, and project-of-the-year judge- junior biological product science category)

2016 - California State Science Fair, May, Los Angeles (judge and chair- junior environmental science category)

Ongoing: slide development and updates to align with DWR Climate Literacy classes and their subsequent updates

Success Determination - Performance Metrics

Number of students reached.

Customers:

K-12 school teachers and educators; K-12 students

Funding Information:

Project Budget (Annual):	\$8,800	Funding Source:	Prop 84 (15/16), GF 16/17
Budget Notes:	<p>STAFF FUNDING - SRO = \$4,800/yr SCRO = \$800/yr NCRO = \$3,200/yr</p> <p>Pursued supporting Project WET, conducted through Water Education Foundation (WEF) - 2014: two pilot workshops through a sponsorship letter (funding from PAO, augmented by USBR directly to WEF) 2015: four workshops through a sponsorship letter (funding from Climate Change Program) - \$13,679 (identified in the newly formed Project WET category).</p>		
Project Start Date:	2010	Project End Date:	n/a

External Partners:

PAO, WEF (California Project WET), USBR, local supporters (location hosts and local facilitators), K-12 teachers and educators, student science fair coordinators

2016 Project Accomplishments

The main activity in 2016 included judging at the California State Science Fair. Staff has been participating in these fairs as a judge since 2010. The California State Science Fair is held annually in Los Angeles at the California Science Center, a state museum promoting science and engineering to students and the local community. The science fair encourages participation by junior and high school students in conducting science research on current and relevant topics. In May 2016, staff served as a judge and chair for the environmental science category for the junior division. Duties included coordinating with other judges, assigning tasks, providing direction and expectations, and chairing the discussion.

Other activities for this category included the following: a rain gauge demonstration and presentation of CoCoRaHS with the Nord Country School in Chico; a presentation on the San Joaquin River Restoration Project to Kerman High School in Kerman; a presentation on the San Joaquin River and the drought to the Tulare Office of Education Migrant Student Journalism class in Fresno; and communicating risks and opportunities on climate change and water in California to educators within the Santa Clara Valley Water District area.

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ II: Tribal Engagement on Climate Change
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- ☐ VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Taking Action to Reduce Residual Risk

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life
Manage and Prepare for Dry Periods

Safeguarding California Implementation Plan

Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure
IRWM

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Local and Regional Planning Coordination

Sponsor/Program Manager	John Andrew; Elissa Lynn
Project Manager	Michelle Selmon

Project Status:

On Going

Project Objective:

The goal is to produce helpful materials that assist local governments/planners in considering and incorporating climate change mitigation and adaptation into local planning efforts. The objectives include the following: (1) produce a list of resources such as websites, documents, case studies, etc. that can be handed out to local government representatives; (2) develop and deliver presentations about climate change as opportunities arise to local government representatives; and (3) develop a list of website links that would help local planners find good information about incorporating climate change into their efforts and add them to the appropriate location on our website.

Project Description:

The California Water Plan Update 2009 identifies the important linkage between land use planning and water resources management, and encourages collaboration on flood management, water supply, water quality, and habitat protection. The Prop 84-funded Integrated Regional Water Management (IRWM) program guidelines encourage regional water managers to coordinate with local planners on projects and priorities. Despite the knowledge that such collaboration is very important, especially in light of the need to plan for future conditions with climate change and the related uncertainties, opportunities are being missed as General Plans, Specific Plans, Hazard Mitigation Plans, local Climate Action Plans (CAPs), and other planning activities are going on that are setting the stage for how development will occur in the next 20-30 years and beyond in California.

This project is intended to use the DWR Climate Team staff, particularly the Regional Climate Change Specialists, to help improve local planning tools and to connect with local planning efforts (e.g., General Plan updates, CAP planning efforts) to specifically inform the efforts regarding the current and future impacts of climate change on water resources, and how they can incorporate those considerations into their plans.

The project seeks to develop key resources that will assist local and regional planners in identifying their climate change vulnerabilities and developing relevant adaptation strategies, with emphasis on the water sector. Such resources might include case-studies of successful local government incorporation of climate change into planning efforts that can serve as models for resource-limited communities. A webpage on the DWR Climate Change portal could serve to provide tools and resources for integrating water management and land use planning. Links to resources for public health, habitat management, and other sectors could be included to facilitate cross-sector planning. At this time, though, such services appear to be filled by other organizations, such as the Local Government Commission and Institute for Local Government.

Climate Change staff has also served in an advisory role for upgrades to Cal-Adapt, an easily-usable web-based tool for obtaining and understanding downscaled climate projection data intended for use by local and regional planning efforts. However, that project has been completed.

Now that the Fresno and Cal/Adapt projects have been completed, this coordination may evolve into commenting on local CAPs.

Note that segments of this item were identified in the 2014 Outreach Report as "Local Government Assistance" and in the 2014 Annual Climate Change Report as "Represent DWR in Interagency and Stakeholder Groups."

Project Deliverables/Timeline

Cal-Adapt Technical Advisory Committee (2013):

- First meeting (November)
- Compilation of input on Cal-Adapt Planned Enhancements from SRO stakeholders (November-December)
- Draft vision/guiding principles and revisions (December)
- Second meeting (December)

List of climate change resources for local governments (2014)

Cal-Adapt Technical Advisory Committee (2014):

- Meetings (February, March, June, August)

Cal-Adapt Advisory Committee (2015):

- Final meeting (May)
- Roll-out of Cal-Adapt 2.0, beta-site, <http://cal-adapt.org/blog/2015/dec/14/cal-adapt-20-beta-site/> (December)

CEQA review (2016)

- template to respond to Climate Action Plans undergoing CEQA review that don't address adaptation

Success Determination - Performance Metrics

Local governments and regional groups use information provided by DWR Regional Climate Change Specialists to incorporate climate change considerations into local planning documents and efforts.

Customers:

local governments and regional groups

Funding Information:

Project Budget (Annual):	\$500	Funding Source:	Prop 84 (15/16), GF 16/17
Budget Notes:	SRO staff = \$500		
Project Start Date:	2013	Project End Date:	

External Partners:

South-Central Region: Local Government Commission, City of Fresno

CalAdapt: CEC and other agencies involved with the technical committee

2016 Project Accomplishments

Work in this area was minimal in 2016. Staff provided new tools and resources to CEC staff maintaining Cal/Adapt, especially in the area of sea-level rise and its applicability to the National Flood Insurance Program.

In addition, staff developed a response template for DWR reviews of CEQA documents associated with local Climate Action Plans that might be deficient in addressing adaptation strategies. The template was reviewed by DWR's Office of Chief Counsel and was favorably received by the Governor's Office of Planning and Research. However, there hasn't been a need yet to use this template. With the advent of Senate Bill 379, which requires that climate change be addressed in local hazard plans and general plan, DWR is looking for an appropriate target audience and determine if it can link CEQA response letters with this bill.

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Managing Floodwaters while Protecting the Ecosystem
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

Protect and Restore Important Ecosystems

Safeguarding California Implementation Plan

Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each Reinforces Sustainable Development That is Resilient to Climate Changes
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

IRWM

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Messaging and Talking Points

Sponsor/Program Manager

John Andrew

Project Manager

Michelle Selmon

Project Status:

Project Initiation Only

Project Objective:

Project will improve communication between public/customers and DWR staff and will eventually lead to improvements in DWR's public image/perception.

Project Description:

While DWR has successfully developed and implemented a number of cutting edge projects and programs and has resources available and can provide assistance on range of topics, DWR has not always done a good job of conveying a consistent, easy-to-understand message. Working with the Public Affairs Office, DWR Climate Change Program staff will develop a limited set of talking points or messaging points that will help guide and hone the information that we provide in future public presentations and documents.

Project Deliverables/Timeline

2017 - List of previously developed FAQs and Common Climate Change Myths will serve as a foundation for developing talking points for Regional Climate Change Specialists and other CC Program staff.

Success Determination - Performance Metrics

Clear, concise talking points are used by all Climate Change Program staff, resulting in increased understanding of DWR's position on the issue as well as increased understanding and acceptance of basic climate facts.

Customers:

Public

Funding Information:

Project Budget (Total):		Funding Source:	
Budget Notes:			
Project Start Date:		Project End Date:	

External Partners:

DWR Public Affairs Office

2016 Project Accomplishments

No further action taken to advance this project

Annual Reporting Category before 2015

N/A

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels

IWM Business Categories

N/A

State Water Project Related? No

Governor's Water Action Plan

N/A

Safeguarding California Implementation Plan

N/A

Legislative and Gubernatorial Mandates

N/A

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Mitigation Team

Sponsor/Program Manager

John Andrew, Elissa Lynn

Project Manager

Qinqin Liu / Jennifer Morales

Project Status:

On Going

Project Objective:

GHG emission reduction in water resource management and planning to implement AB 32 Scoping Plan for climate change mitigation

Project Description:

DWR major actions for GHG emission reduction related to water- energy efficiency for water resource management and planning include 1) developing white paper and conceptual framework to connect climate change with water, energy, and food in ecosystem for GHG reduction, developing water- energy reference and climate science documents related to California Water Plan Update; 2) providing outreach for agriculture water use efficiency, 3) contributing to WETCAT Climate Action Team management actions and coordinating with the WETCAT agencies for AB 32 Scoping Plan implementation, 4) coordinating urban and agricultural water management as well as integrated regional water management programs regarding water energy efficiency and GHG emissions reductions, 5) working with DWR Ecorestore and carbon offset work teams for multiple benefit projects and GHG reduction in water sector.

Project Deliverables/Timeline

White paper DWR have been refined to connect water, energy and food for climate change and related ecosystem processes, and related reference information has been collected by Dec 2016, and regiments for book chapter have been completed by Dec 2016. The white paper and peer reviewed paper included refined conceptual framework from August 2016.

Success Determination - Performance Metrics

Project team had at least 10 meetings and produced and reviewed the white paper and book chapter, reviewed AB32 scoping plan documents in water, green building, forest and natural working land and reviewed at least 14 water-energy grant proposals.

Customers:

WETCAT agencies, agriculture and urban water organizations, the public, local, state, federal and international organizations.

Funding Information:

Project Budget (Annual):	\$224,000	Funding Source:	AB 32
Budget Notes:	Year to year budget depends on AB32 funding. Funds support 2 climate change program staff; Environmental Scientist in the South Central Regional Office on agriculture sector mitigation and Sr. Environmental Scientist Specialist in the Water Use Efficiency Branch on urban sector mitigation.		
Project Start Date:	2011	Project End Date:	In Progress

External Partners:

WETCAT agencies, agriculture and urban water organizations, the public, the public, local, state, federal and international organizations

2016 Project Accomplishments

developed and completed white paper and peer reviewed book chapter and peer reviewed paper to connect water, energy and food as well as ecosystem process with climate change implication; Provided reviews and recommendations on project proposals for DWR water- energy grant program; Provided reviews and recommendations as well as coordination on NSF water, energy and food grant programs; prepared training materials and provided presentations related to water, energy and food as well as ecosystem process with climate change mitigation; provided reviews and recommendations as well as coordination on interagency work teams for AB 32 scoping plan update.

Annual Reporting Category before 2015

Energy & Greenhouse Gas Emissions

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ III: Integrate Climate Change into DWR's Programs and Activities
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- ☐ V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research
- ☐ VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
 Building Capacity for Regional Sustainability
 Taking Action to Reduce Residual Risk
 Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Make Conservation a California Way of Life
 Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
 Achieve the Co -Equal Goals for the Delta
 Protect and Restore Important Ecosystems
 Manage and Prepare for Dry Periods
 Expand Water Storage Capacity and Improve Groundwater Management
 Increase Operational and Regulatory Efficiency

Safeguarding California Implementation Plan

Support Regional Groundwater Management for Drought Resiliency
Diversify Local Supplies and Increase Water Use Efficiency
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Continue to Mainstream Climate Considerations into Water Management
Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each
Reinforces Sustainable Development That is Resilient to Climate Changes
Protect and Restore Water Resources for Important Ecosystems
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions
EO B-30-15: GHG Emissions Reduction 40% below 1990 levels by 2030, 80% below 1990 levels by 2050
EO B-30-15: State Agencies Implement GHG reductions
EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive
Approaches, Protect Vulnerable Populations, Natural Infrastructure
EO B-18-12: Reduce Agency GHG Emissions by 10% by 2015 and 20% by 2020 from 2010 Baseline
EO B-18-12: Zero Net Energy Buildings
SGMA
IRWM
UWMP
California Water Code for California Water Plan

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Office of the California State Climatologist

Sponsor/Program Manager Michael Anderson

Project Manager Michael Anderson

Project Status:

On Going

Project Description:

Through an interagency memorandum of agreement, Dr. Michael Anderson serves as the State Climatologist for California. In that role, Dr. Anderson supports NOAA climate data services in California and facilitates the use of climate data in resources management for California

Project Deliverables/Timeline

Project Completion Reports
ARSCO reports to AASC
Presentations, Course Materials, Interview Notes

Success Determination - Performance Metrics

Meet ARSCO Reporting Requirements
Attend Annual and Regional AASC/WERA102 meetings
Provide Public Outreach Activities (Interviews, presentations, classes)
Oversee Research Projects through UCOP Climate Services Agreement - initiate and see projects through to completion

Customers:

General Public, NOAA, DWR, other State Agencies, local agencies

Funding Information:

Project Budget (Annual):	320,000.00
Budget Notes:	
Project Start Date:	

External Partners:

NOAA NCDC (now NCEI), WRCC, NWS, UCOP and Campuses, NOAA ESRL, USGS Water Science Center

2016 Project Accomplishments

Office of the California State Climatologist
ARSCO Annual Report for 2015-2016

State Climatologist: Michael Anderson,
California Specialist, Western Region Climate Center: Nina Oakley

California Department of Water Resources
Division of Flood Management
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Sacramento, CA 95821
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About the California State Climate Office

The California Office of the State Climatologist (OSC) is housed in the California Department of Water Resources (DWR) Division of Flood Management. Interacting with other divisions within DWR which makes up the state climate office (SCO), Western Regional Climate Center (WRCC), the California Nevada Applications RISA, the University of California through the University of California Office of the President (UCOP) Climate Services Agreement and federal and local agencies, the OSC provides expertise and a growing range of climate services for California.

Communication Capabilities

The Office of the State Climatologist provides climate data services through a variety of data portals like the California Data Exchange Center (CDEC- <http://cdec.water.ca.gov>), the California Irrigation Management Information System (CIMIS – <http://www.cimis.water.ca.gov>), and the Flood Emergency Response Information Exchange (FERIX – <http://ferix.water.ca.gov>). The Office also partners with the Western Region Climate Center which hosts the California Climate Data Archive (<http://calclim.dri.edu>), and the California Climate Tracker (<http://www.wrcc.dri.edu/monitor/cal-mon/>). CDEC alone has generated almost 179 million hits for water year 2016 so far with an average bandwidth per day of 22.3GB. This corresponds to a total of more than 5 million visitors with almost 800,000 unique IPs. Additional data services are provided via email, phone, and mail.

Information Services, Products and Tools

Work continued on many fronts this year. With the ongoing drought in California, the bi-weekly calls with National Weather Service personnel, State Climatologists from California, Nevada, and Oregon, and the US Drought Monitor authors continued to provide input on the drought depiction in California.

Information Services, Products and Tools continued

The State Climatologist serves on the Department of Water Resources' drought management team which plays a leadership role in the State's response to the drought. Updates of hydrologic conditions, the influences of a changing climate and expectations for the next water year are among the services provided by the State Climatologist. The State Climatologist has also been involved in the Department's climate change matrix team which is an internal coordination committee regarding climate change and Department of Water Resources program activities. The team meets quarterly. Also within the Department the State Climatologist has participated in the Climate Change Technical Advisory Group (CCTAG). The CCTAG is a collection of 15 people representing agency, academic, and private practice with expertise in climate change. The California State Climatologist is a permanent member on the committee while other seats are 3-year commitments. The group provides input and feedback on climate change issues relevant to the Department. A report from the group was issued in March of 2015 and can be found at:

http://www.water.ca.gov/climatechange/docs/2015/1_14_16_PerspectivesAndGuidanceForClimateChangeAnalysis_MasterFile_FINAL_08_14_2015_LRW.pdf

At the State level, the State Climatologist is part of the Research Working Group of the Climate Action Team which coordinates climate change research and assessments for the State. In the past year an update to the State's Research Plan was completed and can be found at: http://www.climatechange.ca.gov/climate_action_team/research.html. In the coming year the State's 4th Climate Assessment is being developed and run through the Research Working Group.

Updates of the State's depth duration frequency precipitation bulletin, the Bulletin 195 continues through the ongoing development of web-based tools with an external contractor. The products including a map-based data server will be available on the climate tab of the FERIX portal.

The Department of Water Resources is partnering with the United States Army Corps of Engineers in the Central Valley Hydrology Study to develop new design hydrology data to help the Department's floodplain mapping and flood project studies activities including the Central Valley Flood Protection Plan (CVFPP). This effort will include a climate change component in which the State Climatologist has been taking a lead role. Products of the study are housed at <http://cvhydrology.org/>.

The National Hydrologic Frequency Analysis Workgroup is a collection of agency, academic and private practice personnel who are investigating the possibility of updating the national flood frequency analysis guidelines. The State Climatologist participates as a non-voting member of the work group.

The California State Climatologist also serves on the American Society of Civil Engineers Environmental Water Resources Institute's Hydroclimate Committee which works to raise awareness of links between climate and water management and associated research. Symposia have been held at the past five World Water Congress meetings and one will be held this year in Florida. The 2017 meeting will be in Sacramento California and the State Climatologist is part of the organizing committee.

Research, Projects, and Publications

The California State Climatologist is also partnering with the California Nevada Applications (CNAP) RISA and NOAA for a National Interagency Drought Information System (NIDIS) pilot project in California. Four activities are beginning focusing on different geographic areas of California: south-coastal urban, Klamath basin, Russian basin, and Central Valley. Anne Steinemann of the CNAP RISA left her role as the State coordinator of the projects and Julie Kalansky was hired to fill the role. The projects are continuing in various capacities.

A seasonal forecasting work group has also formed between representatives from the DWR and researchers associated with CNAP and NASA. Topics of discussion range from seasonal to water year forecasts and decadal scale variability. The role of atmospheric rivers in water supply and flood risk and their variability are also being explored in this effort. Multiple research projects have been contracted with CW3E related to atmospheric rivers. More than \$3 million has been invested and these efforts to launch the Center and have attracted additional federal investment in the State and region. Collaborative publications have been developed with CNAP personnel and the State Climatologist including a paper on reservoir and snowpack storage by Mike Dettinger and Mike Anderson at <http://escholarship.org/uc/item/8m26d692>.

As part of the Governor's Executive Orders regarding drought response, investments of approximately \$0.5 million were made in seasonal forecasting research with the University of California, Irvine. The products of that research work will be made available through the climate tab of the FERIX portal.

The State Climatologist is partnering with the University of California Davis Hydrologic Research Laboratory to conduct paired atmospheric hydrologic model studies of extreme precipitation events to better characterize the interactions of the watershed and atmosphere during atmospheric river events. Some early publications from these efforts can be found in the Journal of Hydrologic Engineering.

The State Climatologist is also part of a multi-agency effort researching the viability of forecast informed reservoir operations (FIRO). The effort is being conducted in the Russian River watershed at the Lake Mendocino reservoir. The State Climatologist is part of the steering committee. More information can be found at: <http://cw3e-web.ucsd.edu/firo/>

The State Climatologist is participating in a multi-agency effort with the National Aerospace and Space Administration (NASA) looking at airborne methods to measure snowpack in the Sierra Nevada. The project, called the Airborne Snow Observatory, or ASO, has more information at: <http://aso.jpl.nasa.gov/>.

Outreach and Education

Drought continued to dominate outreach activities. A new record low was achieved for April 1 snowpack at only 5% of average after tying the previous record low in 2014. Over 30 presentations were made to a range of stakeholders and at its peak 6-10 interviews for radio, television, and print media were given. The State Climatologist has worked with the University of California Agriculture and Natural Resources Program and the Cooperative Extension Program for some of these activities.

The State Climatologist has given guest lectures for a water management classes at Humboldt State University and Columbia University in New York. The State Climatologist provides guidance to students' efforts that relate to the drought in California.

The State Climatologist also sat on a Master's Thesis Committee at the University of California Davis and has provided funding for students' work at Scripps Institution of Oceanography and the University of California Merced.

The annual WERA-102 Committee meeting, a meeting of western State Climatologists, the Western Region Climate Center, and federal resource agency partners is being reconstituted with closer ties to the USDA Climate Hubs. The California State Climatologist was part of the re-organization team to get a new approval from the USDA for the committee. A meeting will be held in the next six months to write a completion report on the old committee and plan new efforts moving forward.

Travel and presentations were prominent again this past year. Presentations and/or session moderating duties included meetings for the California Cooperative Snow Surveys Annual Meeting, and American Society of Civil Engineers Environmental Water Resources Institute World Water Congress. Out-of-state travel was limited this past year due to budget issues and will continue to be a challenge.

Monitoring and Impact Assessment

California is now in year 7 of CoCoRaHS. Over 1,500 volunteers have signed up with NWS Weather Forecast Offices taking the lead as regional coordinators with help from some DWR personnel. Observers are located in 55 of California's 58 counties. Approximately 11,000 reports are submitted per month from California's CoCoRaHS volunteers. A summary of CoCoRaHS activity is provided in the State Climatologist monthly summaries. The National Weather Service State Coordinator continues his enthusiastic efforts in building the community in California including maintaining the quarterly newsletter. The OSC is making funds available to purchase rain gages for distribution across the state.

The Department of Water Resources operates multiple mesonets. The California Irrigation Management Information System is a collaborative effort to provide weather data to help inform evaporative demand for agricultural regions. There are over 150 stations spread across the state. Data is served through the CIMIS web portal at <http://www.cimis.water.ca.gov>. A separate mesonet is operated as part of the California Cooperative Snow Surveys to monitor weather and snowpack conditions in the snowmelt watersheds. Data is served through the California Data Exchange Center (<http://cdec.water.ca.gov>).

Work on atmospheric river monitoring continued with the second of four atmospheric river observatories coming online at the McKinnelyville airport on the North Coast of California. This work is in partnership with Scripps Institution of Oceanography's Center for Western Weather and Water Extremes (CW3E) and the National Oceanographic and Atmospheric Administration's Earth Systems Research Laboratory (NOAA ESRL). The first operational site is at Bodega Bay. The final two sites at Point Sur and Goleta are awaiting land use agreements and power for the radar installations. Data from the extreme precipitation network can be found at the Hydrometeorology Testbed web page <http://hmt.noaa.gov> and at the CW3E's atmospheric river portal http://mead.ucsd.edu/?page_id=152. Work on this effort is through a five-year Memorandum of Understanding with NOAA ESRL and with Scripps through the UCOP Climate Services Agreement.

The National Climate Assessment water management work group is providing guidance for the NCA on the development of metrics for climate change that are appropriate for water management at the national scale. The State Climatologist has been an active participant in the work group which is currently drafting a journal article on the initial recommendations for metrics.

At the regional level, the State Climatologist participates in the quarterly climate impacts calls which produce a quarterly 2-pager. An example of these can be found at: <http://drought.gov/drought/content/resources/reports>.

The State Climatologist had the opportunity to serve on a NOAA Services Assessment related to the California drought. From that effort a report was released and can be found at: http://www.weather.gov/media/publications/assessments/drought_ca14.pdf.

In related activity, the State Climatologist has worked with the National Center for Environmental Information on the update of their drought amelioration pages by participating in some workshops held in California. Further work has been proposed and is awaiting funding.

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

N/A

State Water Project Related?**Governor's Water Action Plan**

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government Manage and Prepare for Dry Periods

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding Support Regional Groundwater Management for Drought Resiliency Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources Continue to Mainstream Climate Considerations into Water Management Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
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CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Outreach and Education Subgroup

Sponsor/Program Manager	John Andrew
Project Manager	Lauma Jurkevics

Project Status:

On Going

Project Objective:

Discuss, produce and release educational and outreach materials about climate change, represent DWR and the Climate Change Program by attending outreach events.

Project Description:

The project entails leading the Outreach and Education Team for the Climate Change Program to produce educational and outreach materials about climate change for DWR staff, water managers, and the public. Outreach-related tasks from the Climate Change Program's 2014-2018 Strategic Plan were integrated within this group for further progress and reporting. These tasks, or subgroups as they are called, included the following: K-12 education; sea-level-rise booklet; posters; agricultural mitigation stewardship; citizen science; climate change mitigation; climate literacy; tribal literacy; local government assistance; climate change frequently asked questions; website; and exhibits. A summary report was developed for the 2014 reporting period on these various tasks or subgroups. Starting in 2015, individual progress reporting of these subgroups is identified under their own project reporting.

Project Deliverables/Timeline

2015: Ten monthly team meetings with agendas (Jan-Sep, Nov). Refer to individual project reporting on deliverables for specific subgroups.

2016: Six bi-monthly team meetings with agendas (Jan, Mar, May, Jul, Sep, Nov).
See several individual project reports for some specific outreach deliverables.

Success Determination - Performance Metrics

80% participation by team members at all meetings.

Customers:

DWR staff, local water managers, public

Funding Information:

Project Budget (Annual):	\$125,000	Funding Source:	Prop 84 (15/16), GF 16/17
Budget Notes:	Includes staff time, DWR PAO support, printing, etc.		
Project Start Date:	2013	Project End Date:	n/a

External Partners:

DWR Public Affairs Office, DWR Training Center

2016 Project Accomplishments

Regular meetings of the DWR Climate Change Program Outreach and Education Team were held on the 2nd Monday of every other month, starting in January and ending in November with the May meeting on the 2nd Tuesday to focus on Climate Literacy.

Specific topics, discussions, and evaluations included: Vulnerabilities Map by Region; Project WET (water education for teachers); Agricultural Climate Menu Poster; Climate Literacy; Climate Change Displays at Visitor Centers; South Coast Climate Alliance; Outreach and Activity Reporting; U.S. Fish and Wildlife Outreach Seminar; Climate Change Banners; and the DWR Environmental Scientist Workshop.

Specific reporting and deliverables on some of these topics can be found under individual project reporting.

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ II: Tribal Engagement on Climate Change
- ☐ III: Integrate Climate Change into DWR's Programs and Activities
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- ☐ V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research
- ☐ VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Building Capacity for Regional Sustainability
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life
Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Manage and Prepare for Dry Periods
Increase Flood Protection

Safeguarding California Implementation Plan

Support Regional Groundwater Management for Drought Resiliency
Diversify Local Supplies and Increase Water Use Efficiency
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each Reinforces Sustainable Development That is Resilient to Climate Changes
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

SGMA
IRWM
UWMP

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Paleohydrology

Sponsor/Program Manager

John Andrew

Project Manager

Jeanine Jones

Project Status:

On Going

Project Objective:

Use paleoclimate information to better understand natural climate variability & risks of drought/water shortage. The drought risk information will help support the more rigorous local agency water shortage contingency planning required by Executive Order B-37-16.

Project Description:

In September 2015 DWR executed a contract with the University of Arizona to develop long-term streamflow or precipitation reconstructions using tree ring data for larger Southern California watersheds, the Kern River, and Colorado River inflow to Lake Powell. The work, which includes preparation of a guidebook for water managers on using the data, entails field data collection, sample processing, and statistical modeling.

Project Deliverables/Timeline

By the end of 2017 the University will submit a report providing the reconstructed paleohydrology records and summarizing various statistical analyses of them, along with a guidebook for water managers.

Success Determination - Performance Metrics

Completion of the streamflow reconstructions and guidebook for water managers by the end of 2017, and presentation of the results at a DWR-sponsored forum.

Customers:

DWR Drought program, Water Use Efficiency program, DFM hydrology branch, Climate Change Program and website

Funding Information:

Project Budget (Total):	\$597,000	Funding Source:	Prop 84/General Fund
Budget Notes:	\$125,000 from climate change program (bond), balance from one-time drought funding (General Fund)		
Project Start Date:	2015	Project End Date:	2017

External Partners:

University of Arizona

2016 Project Accomplishments

Field data collection was completed for almost all of the tree-ring chronology sites, as was laboratory analysis of the collected samples. Data QA/QC and assimilation into the statistical reconstruction models were well underway.

Annual Reporting Category before 2015

Field Studies

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O III: Integrate Climate Change into DWR's Programs and Activities
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life
Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Manage and Prepare for Dry Periods

Safeguarding California Implementation Plan

Support Regional Groundwater Management for Drought Resiliency
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

UWMP

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Posters

Sponsor/Program Manager

Elissa Lynn; John Andrew

Project Manager

Peter Coombe

Project Status:

On Going

Project Objective:

The goal is to provide up-to-date posters for workshops and other venues. Objectives include the following: (1) to diversify information for different audiences; (2) to keep poster information current, relevant, and flexible; and (3) to identify ways to make posters accessible to DWR Climate Change Team (Hawks) for presentations.

Project Description:

Posters are an important tool in communicating climate change and the work we do in DWR. This form of outreach is used in a variety of venues, including conferences, DWR annual ES workshops, Project WET workshops with teachers, and the general public. The goal of this project is to provide up-to-date posters, while keeping the topic of climate change up in the forefront.

Project Deliverables/Timeline

Sea-level rise & NFIP posters (2014 & 2015)
Tribal diagram poster (2015)
CoCoRaHS pop-up poster (2015)
Climate Menu poster (2015)
DWR IRWM climate change services poster (2015)
AGU poster (2015)
California climate change vulnerabilities poster (2016)
Climate Change Program banner (2016)

Success Determination - Performance Metrics

Posters are displayed at conferences and events and are made available within the Department and shared with external partners and the public.

Customers:

public, schools, tribes, regional water management groups, and others

Funding Information:

Project Budget (Annual):	\$65,000	Funding Source:	Prop 84 (15/16), GF 16/17
Budget Notes:	SRO = \$11,000/yr (for tribal, IRWM, and NOAA grant posters) SCRO = \$11,200/yr (includes printing costs of ~\$550 for Climate Menu) (for tribal, IRWM, and Climate Menu posters) DSIWM/PAO/NCRO = \$24,400/yr (for tribal, AGU, and IRWM posters) NRO staff = \$800/yr (for IRWM poster), \$16,000 for time.		
Project Start Date:	2014 (as its own project)	Project End Date:	n/a

External Partners:

Various, depending on poster. PAO; DFM, CA Ocean Science Trust, Scripps (NOAA grant project); CDFW, CDFA, Cal Poly, ITRC (Climate Menu); PAO, DFM, CoCoRaHS network (CoCoRaHS pop-up); PAO, CNRA (CA CC vulnerabilities)

2016 Project Accomplishments

A California Climate Change Vulnerabilities Map by Region was developed into a poster and used in various outreach venues, including Project WET workshops, and can be found at <http://water.ca.gov/climatechange/images/CAWaterSectorCCVulnerabilities.jpg>. A QR code was included on the poster to facilitate others in using smart phone devices to link with pertinent on-line information found in the Climate Science Brochure that was released in 2015. This map was also used in the Water Sector Plan of Safeguarding California: Implementation Action Plans (<http://resources.ca.gov/docs/climate/safeguarding/Water%20Sector%20Plan.pdf>).

Also, a Climate Change Program banner was developed and used at various venues, including the 2016 DWR Annual Environmental Scientist Workshop in Davis.

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ II: Tribal Engagement on Climate Change
- ☐ III: Integrate Climate Change into DWR's Programs and Activities
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- ☐ V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Managing Floodwaters while Protecting the Ecosystem
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life
Protect and Restore Important Ecosystems
Manage and Prepare for Dry Periods
Increase Flood Protection

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Diversify Local Supplies and Increase Water Use Efficiency
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Protect and Restore Water Resources for Important Ecosystems
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions
EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure
EO S-13-08: NRC SLR Study
IRWM
UWMP

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Presentations and Publications by Climate Team Members and Associates

Sponsor/Program Manager	John Andrew
Project Manager	Elissa Lynn

Project Status:

On Going

Project Objective:

To provide outreach and technical information and expand climate change knowledge to external audiences, as well as internal ones

Project Description:

This project involves a variety of presentations given to diverse audiences, from basic climate science to technical information. The initial purpose is to promote climate change knowledge beyond DWR, as well as to share experiences in what we have learned along the way in assisting with mitigating for and adapting to climate change in the water sector and beyond. We also are including internal presentations that are outside the venue of our Climate Literacy classes, which are already captured under a different project name.

Presentations include posters, as well as talks to professional organizations, local and regional groups, and industry, and participation through panels, debates, or by being a moderator. Also included is communication through artwork. Starting in 2016, publications that might not be reported elsewhere are now reported under this project item.

Project Deliverables/Timeline

Save for 2017 reporting (also timeline):

Jaime Anderson

Moderator for "Fourth Assessment Projects," 2017 Climate Change Symposium, January, Sacramento

Poster presentation(in conjunction with Louise Bedsworth (lead), OPR; JR De La Rosa, CNRA; Guido Franco, CEC; Susan Wilhelm, CEC; and Joey Wall, CNRA), "California's Fourth Climate Change Assessment: An Overview of Research to Inform Climate-Resilient Policy and Action in California," 2017 Climate Change Symposium, January, Sacramento

John Andrew

"DWR's Climate Change Vulnerability Assessment," Department of Water Resources Environmental Coordination Meeting, February, Sacramento

Minxue (Kevin) He

Poster presentation, "Potential Changes in Water Supply under Future Climate Projections in Sacramento River Watershed," 2017 Climate Change Symposium, January, Sacramento

Lauma (Jurkevics) Willis

Poster presentation: "Integrating Sea-Level Rise and Zone of Flooding Information into Coastal and Floodplain Planning," 2017 California Climate Change Symposium, January, Sacramento

Qinqin Liu

Publications: Liu, Q. 2017. Connecting the Dots between Water, Energy, Food, and Ecosystems Issues for Integrated Water Management in a Changing Climate. Climate Change Program, California Department of Water Resources. February, 2017.

(http://www.water.ca.gov/climatechange/docs/2017/QLf2017FinalWhitePaper_jta_edits_fk_format_2.pdf)

Liu, Q. 2017. WEF Nexus Cases from California with Climate Change Implication. Accepted for publication in Water-Energy-Food Nexus: Theories and Practices (Salam et al. Eds.), AGU Books, ScholarOne, Wiley-Blackwell (in press)

Romain Maendly

Poster presentation: "Development of Stage-Frequency Curves in the Sacramento - San Joaquin Bay Delta for Current Climate, Sea Level Rise and Climate Change Conditions," 2017 California Climate Change Symposium, January, Sacramento

Poster presentation and computer simulation: "CVFPP-Climate Change Analysis and H&H Modeling," Department of Water Resources staff, February, Sacramento

Jennifer Morales

Panelist for "Panel 2 on Water Management," California State University Water Resources and Policy Initiatives Annual Conference: Water Management in a Changing Climate, San Jose State University, April, San Jose

Maurice Roos and Angelique Fabbiani-Leon

Poster presentation, "Recent Changes in Southern Sierra Snowpack," 2017 Climate Change Symposium, January, Sacramento

Andrew Schwarz

"Sacramento San Joaquin Basin Study Hawks Briefing," Department of Water Resources Climate Change Hawks bi-weekly meeting, January, WebEx and Sacramento

Michelle Selmon

"Tulare Basin Watershed Connections Workgroup," Central Valley Joint Venture Board Meeting, February, Los Banos

"California Landscape Conservation Cooperative," Department of Water Resources Environmental Coordination Meeting, February, Sacramento

"Climate Change and Water Management in California," Sacramento Home-Schoolers, February, Sacramento

Panel discussion, Water Stress in a Changing San Joaquin Valley, March, Clovis

Robert Tibstra

"Climate Change and Water in California," Cuesta College (Environmental Biology Class), February, San Luis Obispo

Jianzhong Wang, Hongbing Yin, Erik Reyes, and Francis Chung

Poster presentation, "Climate Change Impact Study with CMIP5 and Comparison with CMIP3," 2017 Climate Change Symposium, January, Sacramento

Success Determination - Performance Metrics

Meeting as many public requests for presentations as possible, by attending and providing tailored content for the audience. Number of people in attendance (to start being tracked in 2017).

Customers:

professional organizations, local and regional groups, industry, and within the organization

Funding Information:

Project Budget (Annual):	\$140,000	Funding Source:	Prop 84 (15/16), GF 16/17
Budget Notes:	SRO=\$35,000/yr SCRO=\$12,800/yr NRO=\$33,280/yr DSIWM=\$10,000/yr CC Program Management=\$50,000/yr		
Project Start Date:		Project End Date:	

External Partners:

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2016 Project Accomplishments

<p>Emily Alejandrino "California Climate 101" joint with Peter Coombe, Department of Water Resources and Water Education Foundation Project WET Workshop, May, West Sacramento</p> <p>"Mitigation and Adaptation in a Changing Climate" joint with Peter Coombe, Department of Water Resources and Water Education Foundation Project WET Workshop, May, West Sacramento</p> <p>"California Climate 101" joint with Qinqin Liu, Department of Water Resources and Water Education Foundation Project WET Workshop, October, San Jose</p> <p>"Mitigation and Adaptation in a Changing Climate" joint with Qinqin Liu, Department of Water Resources and Water Education Foundation Project WET Workshop, October, San Jose</p> <p>"Objective II: Tribal Engagement" as part of "Meeting California's Climate Challenges through Strategic Planning" panel, Department of Water Resources' Annual Environmental Scientist Workshop, University of California at Davis, October, Davis</p> <p>"Climate Change and Job Opportunities," San Jose State University students, December, San Jose</p> <p>Mike Anderson "Climate Overview," Groundwater Management Districts Association, January, Sacramento</p> <p>"California Climate," US Department of Agriculture- Agriculture Research Service, January, Modesto</p> <p>"Climate and Drought," California Cattlemen, January, Redding</p> <p>"Climate and Change in California," Columbia University Class, February, Skype Lecture</p> <p>Water Conditions Workshop, February, Sacramento</p> <p>"California Climate and Change," Rancho Murrieta Rotary, March, Rancho Murrieta</p> <p>Local Government Climate Change Panel, March, West Sacramento</p> <p>"Climate Drought and Change," University of California Agriculture and Natural Resources Conference, March, Seaside</p> <p>"Climate Science," University of California at Davis, April, Davis</p> <p>"Climate Change," California State University at Sacramento, April, Sacramento</p> <p>"WY 2016: State of the Climate - Another Anomalous Year," 2016 Drought Response Workshop, May, Irvine</p> <p>"California Climate and Change," National Oceanic and Atmospheric Administration Climate Literacy Class, June, San Francisco</p>
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"Climate Drought and Change," California Cattlemen, June, Sacramento

"Climate Drought and Change," University of California Center, July, Sacramento

"Climate Drought and Change," July, Temecula

"Climate Drought and Change," Sonoma Rotary, September, Sonoma

"Climate Change and Ag Health," Western Center for Agricultural Health and Safety, University of California at Davis, September, Winters

"Climate Drought and Change", Loomis Rotary, September, Loomis

"Climate Drought and Change," Yosemite Hydroclimate Meeting, October, Yosemite

"Climate Drought and Change," Rancho Murrieta Garden Club, October, Rancho Murrieta

"Climate Drought and Change" (keynote speaker), 2016 California Association of Nurseries and Garden Centers Convention, October, Oxnard

"Climate Change and Reservoir Elevations and Seasonal Predictability," State Water Project Recreation Coordination Meeting, November, West Sacramento

"Climate Drought and Change," Placerville Rotary, November, Placerville

John Andrew

"Overview of DWR's Climate Change Activities," as part of briefing on "Consideration of Climate Change in Water Resources Planning," California Water Commission, January, Sacramento

"Adapt, Flee, or Perish: Responses to Climate Change for California's Water Sector," Tiburon/Belvedere Rotary Club, February, Belvedere

"Adapt, Flee, or Perish: Responses to Climate Change for California's Water Sector," California Water Law and Policy Class, University of California at Santa Cruz, February, Santa Cruz

"An Overview of the California Drought," Drought Forum, Stanford University, February, Stanford

"Adapt, Flee, or Perish: Responses to Climate Change for California's Water Sector," Solano Irrigation District, March, Vacaville

"Adapt, Flee, or Perish: Responses to Climate Change for California's Water Sector," California Department of Public Health Local Primacy Agencies, May, Sacramento

"An Overview of the California Drought," Beahrs Environmental Leadership Program, July, Berkeley

"Adapt, Flee, or Perish: Responses to Climate Change for California's Water Sector," Humphrey Fellows Program, October, Sacramento

"Adapt, Flee, or Perish: Responses to Climate Change for California's Water Sector," California Environmental Law and Policy, University of California at Davis, November, Davis

Peter Coombe

"California Climate 101" joint with Emily Alejandrino, Department of Water Resources and Water Education Foundation Project WET Workshop, May, West Sacramento

"Mitigation and Adaptation in a Changing Climate" joint with Emily Alejandrino, Department of Water Resources and Water Education Foundation Project WET Workshop, May, West Sacramento

"Klamath Basin Study: An Upside-Down River," Department of Water Resources Climate Change Matrix Team quarterly meeting, July, Sacramento

"Klamath Basin Study: Project Summary and Results," Department of Water Resources Northern Region Office, September, Red Bluff

Rain Gauge Demonstration and CoCoRaHS, Nord Country School, September, Chico

Poster presentation: "CoCoRaHS Citizen Science," Marin Flood Preparedness Fair, October, San Rafael

"Climate Jeopardy" activity, Department of Water Resources' Annual Environmental Scientist Workshop, University of California at Davis, October, Davis

"Objective V: Data and Research" as part of "Meeting California's Climate Challenges through Strategic Planning" panel, Department of Water Resources' Annual Environmental Scientist Workshop, University of California at Davis, October, Davis

Jeanine Jones

Publication: Jones, J. 2016. California, a State of Extremes: Management Framework for Present-Day and Future Hydroclimate Extremes. Chapter 11, Pages 207-222 in Water Policy and Planning in a Variable and Changing Climate. Edited by K.A. Miller, A.F. Hamlet, D.S. Kenney, and K.T. Redmond. CRC Press 2016. Print ISBN: 978-1-4822-2797-0. eBook ISBN: 978-1-4822-2798-7. DOI: 10.1201/b19534-15.

Lauma (Jurkevics) Willis

"California Climate 101" joint with Elissa Lynn, Department of Water Resources and Water Education Foundation Project WET Workshop, April, Riverside

"Mitigation and Adaptation in a Changing Climate" joint with Elissa Lynn, Department of Water Resources and Water Education Foundation Project WET Workshop, April, Riverside

Invited Debater, "Water and Fire: Impacts of Climate Change" Conference, Institute on Science for Global Policy and California State University-Sacramento, April, Sacramento (<http://scienceforglobalpolicy.org/wp-content/uploads/5853f07e809e0-Water%20and%20Fire%20-%20Impacts%20of%20Climate%20Change.pdf>)

"Los Angeles Basin Stormwater Conservation Study Synopsis," Department of Water Resources Climate Change Hawks biweekly meeting, June, WebEx and Sacramento

"Department of Water Resources Climate Action Plan," Thailand Consul General, September, Glendale

"Objective I: Communication and Outreach" as part of "Meeting California's Climate Challenges through Strategic Planning" panel, Department of Water Resources' Annual Environmental Scientist Workshop, University of California at Davis, October, Davis

"Department of Water Resources Climate Action Plan," Department of Water Resources Southern Region Office Managers briefing, October, Glendale

Poster presentations:

"Climate Change on Your Plate," San Diego Integrated Regional Water Management Summit, February, Escondido

"Climate Change: Stressing Our Water Systems," Department of Water Resources and Water Education Foundation Project WET Workshop, April, Riverside

"Climate Change Vulnerabilities," Department of Water Resources and Water Education Foundation Project WET Workshop, April, Riverside

"The Water Cycle," Department of Water Resources and Water Education Foundation Project WET Workshop, April, Riverside

"Climate Change on Your Plate," Climate Resilience Workshop, General Membership Meeting #38, Watersheds Coalition of Ventura County, April, Ventura

Qinqin Liu

Art exhibition on watershed and climate change for dialogue between arts and environmental science, November 2015-January 2016, Taiwan Science Museum, Taipei

Delta smelt art auction, CA Water Education Foundation Conference, April

Climate art show: "Changing Nature (I, II, III)," watercolor mixed media with collage, School of Visual Art Summer Residency Program Art Show, June, New York

Outreach for Water Conservation Show Case, California State Fair, July, Sacramento

"California Climate 101" joint with Emily Alejandrino, Department of Water Resources and Water Education Foundation Project WET Workshop, October, San Jose

"Mitigation and Adaptation in a Changing Climate" joint with Emily Alejandrino, Department of Water Resources and Water Education Foundation Project WET Workshop, October, San Jose

"Objective VI: Reducing GHGs" as part of "Meeting California's Climate Challenges through Strategic Planning" panel, Department of Water Resources' Annual Environmental Scientist Workshop, University of California at Davis, October, Davis

Publication: Liu, Q. 2016. Interlinking Climate Change with Water-Energy-Food Nexus and Related Ecosystem Processes in California Case Studies. In: Ecological Processes (2016) 5: 14. DOI: 10.1186/s13717-016-0058-0. Part of the Global Change and Ecological Processes topical collections. (http://link.springer.com/article/10.1186/s13717-016-0058-0?wt_mc=Internal.Event.1.SEM.ArticleAuthorIncrementalIssue)

Elissa Lynn

"Climate Science and the Impacts of Climate Change in California," as part of briefing on "Consideration of Climate Change in Water Resources Planning," California Water Commission, January, Sacramento

"California Climate 101" joint with Lauma (Jurkevics) Willis, Department of Water Resources and Water Education Foundation Project WET Workshop, April, Riverside

"Mitigation and Adaptation in a Changing Climate" joint with Lauma (Jurkevics) Willis, Department of Water Resources and Water Education Foundation Project WET Workshop, April, Riverside

"Climate Jeopardy" activity, Department of Water Resources' Annual Environmental Scientist Workshop, University of California at Davis, October, Davis

Moderator for "Meeting California's Climate Challenges through Strategic Planning" panel and presenter of "Climate Change Program, Strategic Planning, and CAP" as part of the panel, Department of Water Resources' Annual Environmental Scientist Workshop, University of California at Davis, October, Davis

Romain Maendly

"Development of Stage-Frequency Curves in the Sacramento-San Joaquin Bay-Delta," California Water and Environmental Modeling Forum Annual Conference, April, Folsom

"Development of Stage-Frequency Curves in the Sacramento-San Joaquin Delta," Department of Water Resources Climate Change Matrix Team quarterly meeting, July, Sacramento

"Development of Stage-Frequency Curves in the Sacramento-San Joaquin River Delta for Existing, Sea Level Rise and Climate Change Conditions," Floodplain Management Association Annual Conference, September, Sacramento

"CVFPP – Climate Change Analysis," Central Valley Flood Protection Board Climate Change Workshop, October, West Sacramento

"Development of Stage-Frequency Curves in the Sacramento - San Joaquin River Delta for Existing, Sea Level Rise and Climate Change Conditions," Sea-Level-Rise Mapping Coordination Group (state-federal interagency bi-monthly meeting), November, Oakland

Poster presentation and computer simulation: "CVFPP – Climate Change Analysis and H&H Modeling," Department of Water Resources-Central Valley Flood Protection Plan Open House, December, Sacramento

Jennifer Morales

Poster presentations: "Climate Change on Your Plate," "State Water Efficiency and Enhancement Program," and "Climate Change Vulnerabilities" posters, World Ag Expo, International Agri-Center, February, Tulare

Poster presentations: "Climate Change on Your Plate," "State Water Efficiency and Enhancement Program," and "Climate Change Vulnerabilities" posters, Ag at the Cap, The Capitol, March, Sacramento

"The San Joaquin River Restoration Project," Kerman High School, April, Kerman

"Water Education Foundation Tour of the Lower Colorado River," Department of Water Resources Climate Change Program Hawks bi-weekly meeting, April

"Objective IV: Integration Beyond DWR" as part of "Meeting California's Climate Challenges through Strategic Planning" panel, Department of Water Resources' Annual Environmental Scientist Workshop, University of California at Davis, October, Davis

"California Climate 101" joint with Michelle Selmon, Department of Water Resources and Water Education Foundation Project WET Workshop, November, Visalia

"Mitigation and Adaptation in a Changing Climate" joint with Michelle Selmon, Department of Water Resources and Water Education Foundation Project WET Workshop, November, Visalia

"Climate Change and Water Resources in California," College of the Sequoias, December, Visalia

"The San Joaquin River and the Drought," Tulare Office of Education Migrant Student Journalism Class - Woodward Park, December, Fresno

Andrew Schwarz

"Modeling and Climate Change Analysis for Planning Purposes," as part of briefing on "Consideration of Climate Change in Water Resources Planning," California Water Commission, January, Sacramento

"Decision Scaling with CalLite to Identify Climate Change Vulnerabilities to the State Water Project," California Water and Environmental Modeling Forum Annual Conference, April, Folsom

Panel speaker/roundtable discussion, meeting with State Water Resources Control Board – Deputy Management Committee, May, Sacramento

"Proposed Revisions to Climate Change Analysis in WSIP Regulations," California Water Commission, July, Sacramento

"DWR Climate Change Vulnerabilities: Taking a New Approach," meeting with San Francisco Public Utilities Commission, September, San Francisco

Staff report ("Water Storage Investment Program Climate Change Projections for 2030 and 2070") and subject matter expert testimony, California Water Commission, October, Sacramento
(https://cwc.ca.gov/Documents/2016/10_October/October2016_Agenda_Item_8_Attach_2_2030-2070Projections_Final.pdf)

"Effective Decision Maker-Scientist Engagement: Analysis of California's Water System Using Decision Scaling," American Geophysical Union Fall Conference, December, San Francisco

Michelle Selmon

"Climate Change and Water in California: Opportunities for Integrated Natural Resources Management," California State University at Stanislaus Lecture, February, Turlock

"Adapting to California's Changing Climate," Watershed University, April, Atwater

"Communicating Climate Change to California Water Managers," University of California at Merced Climate & Water Tools for Informed Agricultural Decisions, May, Merced

"Climate Change and Water in California: Communicating Risks and Opportunities," Santa Clara Valley Water District educators meeting, June, Santa Clara

"Climate Change Impacts for the Bay-Delta Region," Water Education Foundation tour, June, Sausalito

"Introduction to Climate Change," Climate Change for Agriculture and Disadvantaged Communities, October, Tulare

“Objective III: Integration into DWR Programs” as part of “Meeting California’s Climate Challenges through Strategic Planning” panel, Department of Water Resources’ Annual Environmental Scientist Workshop, University of California at Davis, October, Davis

“Climate Change and Water in California: Opportunities for Integrated Natural Resources Management,” Sierra College lecture, November, Rocklin

“Climate Change and Water in California: Opportunities for Mitigation and Adaptation,” Brazilian Delegation, November, Sacramento

“California Climate 101” joint with Jennifer Morales, Department of Water Resources and Water Education Foundation Project WET Workshop, November, Visalia

“Mitigation and Adaptation in a Changing Climate” joint with Jennifer Morales, Department of Water Resources and Water Education Foundation Project WET Workshop, November, Visalia

“Climate Change and Water in California: Opportunities for Integrated Natural Resources Management,” Tuolumne-Stanislaus Integrated Regional Water Management meeting, November, Sonora

“Truckee Basin Study Briefing for DWR Climate Hawks,” Department of Water Resources Climate Change Program Hawks bi-weekly meeting, December, WebEx and Sacramento

Robert Tibstra

“Climate Jeopardy” activity, Department of Water Resources’ Annual Environmental Scientist Workshop, University of California at Davis, October, Davis

“Climate Change Program Overview,” San Jose State University (Environmental Studies 185 Environmental Impact Assessment Class), December, San Jose

“Climate Change Program Overview,” San Jose State University (Environmental Studies 190 Advanced Environmental Impact Assessment Class), December, San Jose

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O II: Tribal Engagement on Climate Change
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research
- O VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Managing Floodwaters while Protecting the Ecosystem
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life
Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Achieve the Co -Equal Goals for the Delta
Protect and Restore Important Ecosystems
Manage and Prepare for Dry Periods
Expand Water Storage Capacity and Improve Groundwater Management
Provide Safe Water for All Communities
Increase Flood Protection
Increase Operational and Regulatory Efficiency

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Support Regional Groundwater Management for Drought Resiliency
Diversify Local Supplies and Increase Water Use Efficiency
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Protect and Restore Water Resources for Important Ecosystems
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions
EO B-30-15: GHG Emissions Reduction 40% below 1990 levels by 2030, 80% below 1990 levels by 2050
EO B-30-15: State Agencies Implement GHG reductions
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure
EO B-18-12: Reduce Agency GHG Emissions by 10% by 2015 and 20% by 2020 from 2010 Baseline
EO B-18-12: Reduce Grid Based Energy Purchases for State Buildings by 20% by 2018 as Compared to 2003 Baseline
EO S-13-08: NRC SLR Study
IRWM
California Water Code for California Water Plan

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Project WET Climate Change Workshops

Sponsor/Program Manager

John Andrew, Water Education Foundation

Project Manager

Elissa Lynn

Project Status:

On Going

Project Objective:

To promote climate literacy to teachers and educators through Project WET.

Project Description:

Although California has been on the forefront in addressing climate change, understanding climate variabilities, human actions, and solutions may not be as evident at the local public level. Since a changing climate will more profoundly affect future generations, DWR decided to expand its existing connections with Project WET (Water Education for Teachers) to integrate climate literacy into the workshops led by CA Project WET Coordinator at the Water Education Foundation. Though this project was previously reported under other categories, future reporting will be covered under its own specific category.

Project Deliverables/Timeline

DWR-sponsored Project WET climate change workshops:

2014 - two pilot workshops (Oroville and Visalia), April-May

2015 - four workshops (Los Angeles, Bishop, Redding, Fresno), April, June, and September

2016 - four workshops (Riverside, West Sacramento, San Jose, Visalia)

2017 - four workshops (Kelseyville, Bishop, Merced, Santa Maria)

2018 - four workshops (South Lake Tahoe or Nevada City, San Diego, Arcata, Chico)

Success Determination - Performance Metrics

of participants

Customers:

K-12 school teachers and educators; K-12 students

Funding Information:

Project Budget (Annual):	\$67,000	Funding Source:	Prop 84 (15/16), GF 16/17
Budget Notes:	<p>STAFF FUNDING - SRO = \$35,000/yr SCRO = \$7000/yr NCRO = \$4000/yr NRO = \$16,640/yr DSIWM = \$4200/yr</p> <p>Pursued supporting Project WET, conducted through Water Education Foundation (WEF) - 2014: two pilot workshops through a sponsorship letter (funding from PAO, augmented by USBR directly to WEF)</p> <p>2015: four workshops through a sponsorship letter (funding from Climate Change Program) - \$13,679</p> <p>2016: two Spring workshops through PAO contract (#4600011185) - \$3,309 (Riverside; WEF Invoice #: 12011), \$3,086 (West Sacramento; WEF Invoice #: 12012) + two Fall workshops - \$3,420 (San Jose; WEF Invoice #: 12013), \$3,478 (Tulare; WEF Invoice #: 12014, 12014-Phase 2).</p>		
Project Start Date:	2013	Project End Date:	n/a

External Partners:

PAO, WEF (California Project WET), USBR, local supporters (location hosts and local facilitators), K-12 teachers and educators

2016 Project Accomplishments

The Climate Change Program continued to support Project WET workshops in 2016. DWR's Public Affairs Office (PAO) provided administrative support. This year was unique in that instead of providing funding through sponsorships letter, PAO instituted a contract process with the Water Education Foundation, the lead for CA Project WET. Staff reviewed the contract process and provided comments.

In 2016, four Project WET workshops were held in Riverside, West Sacramento, San Jose, and Visalia. A watershed approach was added to the mix of the lectures, with more emphasis occurring in the Riverside and Visalia workshops.

Partners for the 2016 workshops included the following: Riverside - Santa Ana Watershed Project Authority; West Sacramento - City of West Sacramento with project partners from Yolo County Office of Education and the CREEC Network (California Regional Environmental Education Community); San Jose - Santa Clara Valley Water District; Visalia: Tulare County Office of Education with their project partner Tulare Basin Watershed Connections Workgroup.

The California Project WET coordinator finalized a project report, which indicated that a total of 95 educators from variety of educational settings attended the four workshops. Participants were predominately involved in formal, K- 12 classroom education (71%). Non-formal educators working with water utility outreach programs, outdoor schools, State agencies and local non-profits represented most of the remaining participants attending the 2016 workshops.

The only challenges in conducting the 2016 workshops were technology glitches and miscommunication amongst Tulare County Office of Education staff. All 95 of the educators attending the 2016 DWR-Project WET Climate Change workshops reported on exit evaluations that they plan to use the Project WET activities and information provided by the DWR climate change workshop teams with approximately 26,010 California K-12 students.

A positive outcome of these climate change-oriented Project WET workshops is that a co-Principal Investigator for the climate and ocean education project Inquiry to Student Environmental Action (I2SEA) recently asked the California Project WET program to partner in a California Coastal Commission Whale-tail Grant application. The proposed project is to pilot a 3-day summer institute that will focus on connecting climate change impacts between inland California and the ocean using Project WET, climate education tools I2SEA has developed, and other resources as appropriate.

The target audience for the institute will be middle school teachers in the Central Valley. A Project WET Facilitator who has led a couple of the DWR-Project WET Climate Change workshops is anticipated to be the primary Project WET and ocean education lead if the grant were to be awarded. This will be a great opportunity for middle school teachers that have attended the DWR-Project WET climate change workshops.

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ II: Tribal Engagement on Climate Change
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- ☐ VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Taking Action to Reduce Residual Risk

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life
Manage and Prepare for Dry Periods

Safeguarding California Implementation Plan

Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure
IRWM

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Quantification Methodologies (QM) and GHG Calculator for GGRF Round 2

Sponsor/Program Manager	WUE, Climate Change Program, ARB
Project Manager	Jim Lin

Project Status:

On Going

Project Objective:

Help ARB in developing and reviewing QM and water-energy-GHG calculators for GGRF (Greenhouse Gas Reduction Fund) Program Round 2. The calculators have been used to estimate water conservation/water saving, energy saving, and GHG emissions reduction in various funding programs.

Project Description:

GGRF Program Round 2 awarded DWR \$19 million grant money coming from cap-and-trade program. The grant money was to fund eligible commercial, institutional, and residential projects which deemed to save water and energy as well as to achieve GHG emissions reduction. DWR helped ARB in developing QM and designing calculator. DWR also developed the PSP Guidelines. We received and reviewed 23 proposals. In addition, DWR also helped ARB in developing another GHG calculator used for the agricultural water suppliers.

Project Deliverables/Timeline

(1) The QM and calculator for the commercial, institutional, and residential: development started in early 2016. Total 23 application proposals were received in early November 2016. Technical and comprehensive reviews completed in late December 2016. The final award list will be released in mid-2017. Most projects will be completed in two to three years by the grant recipients. (2) QM and agricultural QM and GHG calculator: project deliverable and timeline is similar to those mentioned in item (1).

Success Determination - Performance Metrics

1. Water savings in gallons per year as well as in project lifetime;
2. Energy savings in KWh (for electricity) or therm (natural gas or other fossil fuels) per year as well as in project lifetime;
3. GHG emission reductions in MTCO₂e annually as well as in project lifetime;

Customers:

Local agencies, commercials, institutional, and residential (DACs - Disadvantaged Communities)

Funding Information:

Project Budget (Annual):	\$24,000	Funding Source:	Cap and Trade (GGRF)
Budget Notes:	Budget comes from Cap and Trade Fund (GHG Reduction Fund or GGRF)		
Project Start Date:	1/1/2016	Project End Date:	approx. 12/31/2019

External Partners:

ARB, CDFA

2016 Project Accomplishments

Water-Energy grant (GGRF) proposals were reviewed and evaluated, and awarding list was released. Some of the GGRF Project Agreements with the local agencies were also signed and entered into implementation and monitoring stage.

Annual Reporting Category before 2015

Energy & Greenhouse Gas Emissions

Climate Change Objectives

- O III: Integrate Climate Change into DWR's Programs and Activities
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research
- O VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
 Building Capacity for Regional Sustainability
 Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Make Conservation a California Way of Life
 Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
 Achieve the Co -Equal Goals for the Delta
 Manage and Prepare for Dry Periods
 Provide Safe Water for All Communities

Safeguarding California Implementation Plan

Diversify Local Supplies and Increase Water Use Efficiency
 Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
 Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
 Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
 Continue to Mainstream Climate Considerations into Water Management
 Utilize Low-impact Development and Other Methods in State and Regional Stormwater Permits to Restore the Natural Hydrograph
 Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each Reinforces Sustainable Development That is Resilient to Climate Changes
 Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions
EO B-30-15: GHG Emissions Reduction 40% below 1990 levels by 2030, 80% below 1990 levels by 2050
EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure
IRWM
UWMP
California Water Code for California Water Plan

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Rain/Snow Trends

Sponsor/Program Manager

Mike Anderson

Project Manager

Elissa Lynn / Kevin He

Project Status:

On Going

Project Objective:

To produce gridded estimates of historical rainfall as a fraction of total precipitation for areas comprising the major snowmelt water-supply watersheds of California, and provide water resources management implications for these trends.

Project Description:

Rain/Snow trend analysis methodology and results were determined by the workgroup of Mike Anderson, Aaron Cuthbertson, Kelly Redmond (WRCC), and Elissa Lynn, resulting in the release of "Estimating Historical California Precipitation Phase Trends Using Gridded Precipitation, Precipitation Phase, and Elevation Datasets" as part of the California Water Plan Update 2013. See link for background:

<http://www.water.ca.gov/climatechange/docs/Estimating%20Historical%20California%20Precipitation%20DWR%20CWP%207-7-2014%20FINAL.pdf>. Ongoing improvements in methodology and water resources implications are ongoing. Kevin He was added to the work team.

Project Deliverables/Timeline

Submission and publication of an updated version of "Estimating Historical California Precipitation Phase Trends Using Gridded Precipitation, Precipitation Phase, and Elevation Datasets" in Journal of Hydrometeorology, hoping for 2017. Ongoing assessments of Rain/Snow will be conducted annually in the Hydroclimate Report.

Success Determination - Performance Metrics

Release of journal article.

Inclusion and annual update of Rain/Snow in the Hydroclimate Report (see that project).

Acceptance by the research community of this unique approach to assessing rain/snow trends for California.

Customers:

Public, science research community, water managers

Funding Information:

Project Budget (Annual):	\$30,000	Funding Source:	General Funds starting in FY 16/17
Budget Notes:	Staff time is given to this project on a time-available basis.		
Project Start Date:	2011	Project End Date:	

External Partners:

Western Region Climate Center

2016 Project Accomplishments

Updates to methodology, assessment, and data gathering made by Aaron Cuthbertson. Several meetings to discuss new approaches to analyze time and spatial variations of rain/snow trends, and assess/write up water resources management implications for CA.

Annual Reporting Category before 2015

N/A

Climate Change Objectives

O I. Develop and Improve Communication, Outreach and Education on Climate Change
O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Ensuring Reliable Water Supply for All Californians

State Water Project Related?

Yes

Governor's Water Action Plan

Manage and Prepare for Dry Periods
Increase Flood Protection

Safeguarding California Implementation Plan

Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
California Water Code for California Water Plan

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Regional Flood Management Programs Support

Sponsor/Program Manager	DFM/Michael Mierzwa
Project Manager	Ricardo Pineda / Christopher Williams

Project Status:

On Going

Project Objective:

Complete regional flood management plans for areas protected by the facilities of the State Plan of Flood Control. The regional flood management plans are a key component and support the development of the 2017 update to the 2012 Central Valley Flood Protection Plan.

Project Description:

Local interests, with financing from DWR, have completed six regional flood management plans for the following regions: Feather River Region; Mid and Upper Sacramento Region; Lower Sacramento River/Delta North Region; Lower San Joaquin/Delta South Region; Mid San Joaquin River Region; and Upper San Joaquin River Region. Links to final RFMPs reports for all six regions are available at the Central Valley Flood Protection Board Coordinating Committee website "www.RFMPCC.com." Also available at the DWR CVFMP website. Regional Flood Management Planning support will continue under Phase 2 of the six work agreements through 2017.

Project Deliverables/Timeline

Work under the Phase Two work agreements for the six RFMPs is ongoing and will be completed when the Central Valley Flood Protection Board adopts the 2017 update to the 2012 Central Valley Flood Protection Plan. Regional partner coordination continues through adoption of the 2017 CVFPP update by the Central Valley Flood Protection Board. In June 2017. RFMP Phase Two ends.

Success Determination - Performance Metrics

Regional partnerships strengthened. State-Local-Federal cooperation strengthened, regional governance improved, and 2017 update generally accepted and embraced at 2017 public workshops and public hearings.

Customers:

Department of Water Resources, Central Valley Flood Protection Board, U.S. Army Corps of Engineers, Federal Emergency Management Agency, California Governor's Office of Emergency Services, SPFC regional flood control agencies, SPFC reclamation and levee districts, SPFC affected tribal entities, SPFC affected cities, and SPFC affected counties.

Funding Information:

Project Budget (Total):		Funding Source:	Proposition 1E
Budget Notes:	One time funding agreements amended for time, scope and funding.		
Project Start Date:	2012	Project End Date:	2017

External Partners:

Central Valley Flood Protection Board, United States Army Corps of Engineers, State Plan of Flood Control (SPFC) Reclamation and Levee Districts, SPFC Regional Flood Control Agencies, SPFC affected tribal entities, SPFC affected counties, SPFC affected cities, SPFC affected water districts and agencies, private agriculture, California Farm Bureau and local farm bureaus,

2016 Project Accomplishments

Coordination continues with regional partners and FRMP Plans used to inform DWR Basin-Wide Feasibility Studies and other 2017 CVFPP update documents.

Annual Reporting Category before 2015

Field Studies

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O II: Tribal Engagement on Climate Change
- O III: Integrate Climate Change into DWR's Programs and Activities
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Building Capacity for Regional Sustainability
Managing Floodwaters while Protecting the Ecosystem
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Protect and Restore Important Ecosystems
Increase Flood Protection

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Protect and Restore Water Resources for Important Ecosystems

Legislative and Gubernatorial Mandates

IRWM

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Represent DWR in Interagency, Stakeholder and Safeguarding CA Groups

Sponsor/Program Manager

John Andrew, Elissa Lynn

Project Manager

Elissa Lynn

Project Status:

On Going

Project Objective:

For regional DWR staff to represent DWR in a variety of interagency and stakeholder groups within California

Project Description:

Federal, state, and local agencies, as well as other entities, have been convening workgroups to facilitate discussions in preparing for climate change, to understand the dynamics of water management and the interaction with managing other resources, and to implement the measures identified in the 2009 California Climate Adaptation Strategy and in subsequent updates, such as Safeguarding California: Reducing Climate Risk and Safeguarding Implementation and reporting. Regional DWR staff represents DWR in these discussions, communicates the agency's perspectives, provides technical expertise and climate change resources, and reports to the Climate Change Program on relevant information that DWR can use in its own departmental activities.

Project Deliverables/Timeline

2015

- Baylands Ecosystem Habitat Goals Technical Update – final report, October
- CA-LCC product: Climate Summit (October); Tribal Climate Adaptation Training (Fall)
- 4 Project WET workshops sponsored by DWR's Climate Change Program (April, June, September) (refer to "Project WET" category)
- LACFCD/USBR Basin Study products: Stormwater Capture Opportunities and Options List; Technical Analysis Criteria; Economic Analysis; Environmental and Social Effects; Trade-Off Analysis; Trade-Off Analysis & Recommendations Interim Report (refer to "Basin Studies" category)
- Klamath Basin Study product: a series of nine final technical reports and a final report (refer to "Basin Studies" category)
- Truckee Basin Study draft final report and final report (refer to "Basin Studies" category)
- NOAA Grant products: Needs Assessment; Coastal Appendix to Quick Guide (drafts); Initial Drafts of Technical Methods Manual; presentations at FMA Conference (September) (refer to "Integrating SLR into NFIP" category)

2016

- Safeguarding CA Implementation Plan, Water Sector (March)
- Safeguarding CA update - Coastal Section draft (SLR and coastal flood work highlights being done by DWR, submitted to CO-CAT) (December)
- LARC's Draft Framework (July) and Final Framework (December)
- CHARG, Technical Working Group - Sea Level Rise Regional Survey (June); Adaptation Strategies Workplan (June)
- DWR presentation to SLR Mapping Coordination Group (November)

2017

- Safeguarding CA Update (water and coastal sections)
- SLR Guidance Update (Interviews by OPC consultants of DWR staff-Mar; CO-CAT feedback on draft framework-May/Jun; CO-CAT feedback on draft guidance-Sep/Oct)

2018

- SLR Guidance Update (w/ CO-CAT input - OPC approval)

ONGOING

Provide lead support for the Water Sector and DWR project tracking for Implementation of Safeguarding California.

Success Determination - Performance Metrics

Participation in requested workgroups. Contribute ideas, or in some cases, content and materials for release, based on each groups' needs.

Customers:

Federal, state and local agencies, water and electrical providers, teachers, non-profit entities, and DWR climate change program (as this project gets re-defined and split into categories, customers will change)

Funding Information:

Project Budget (Annual):	\$200,000	Funding Source:	Prop 84
Budget Notes:	SRO - \$35,000/yr (includes NCRO for 2015) SCRO - \$23,000/yr NRO - \$133,120/yr CC Program Management - AS and EL and other DWR staff for Safeguarding, \$18,000/ year of staff time.		
Project Start Date:	January, 2010	Project End Date:	In Progress

External Partners:

Federal, state, and local agencies, water and electrical providers, teachers, and non-profit entities (as this project gets re-defined and split into categories, partners will change)

2016 Project Accomplishments

Regional DWR staff continued to participate in the following workgroups: California Landscape Conservation Cooperative (CA-LCC), Capital Region Climate Readiness Collaborative, Sea-Level-Rise Mapping Coordination Group, Coastal and Oceans Working Group of the Climate Action Team (CO-CAT), and the Tulare Basin Watershed Connections Workgroup. A climate change workshop was developed in conjunction with this latter workgroup, in which DWR staff continues to serve as the workgroup's coordinator.

For the SLR Mapping Coordination Group, regional staff brought in DWR-CVFPP staff to present research being done in the Sacramento - San Joaquin River Delta for existing, sea-level rise, and climate change conditions. This group is led by the State Coastal Conservancy and meets bi-monthly in Oakland and serves as a state-federal interagency group to share research and projects being conducted on the coast regarding sea-level rise.

Staff also became actively involved with the San Francisco Bay Regional Coastal Hazards Adaptation Resiliency Group (CHARG: <http://www.acfloodcontrol.org/SFBayCHARG/>), specifically in the Technical Working Group and two of its subgroups: Sea-Level Rise Science and Adaptation Strategies. Products developed included a "Sea Level Rise Regional Survey" (to understand how the jurisdictions along the region's shoreline are studying and planning for sea-level rise) and an Adaptation Strategies Workplan. Staff also coordinated a meeting between DWR management and CHARG lead members to further collaborate on information sharing and technical support.

Staff also served multiple roles with the CA-LCC, including being Chair of the Steering Committee, past-Chair of the Tribal Team, and members on the Science Management and Communication Teams. Though, it should be noted that some of the teams, like the Communication Team, did not meet in 2016.

Staff continued to participate with the Los Angeles Regional Collaborative on Climate Action and Sustainability (LARC) in developing a Climate Action Framework for Los Angeles County. The Framework ("A Greater LA: Climate Action Framework") identifies priorities for various resource sectors in Los Angeles County. The final Framework, supported with funding from the Local Government Commission, was released in December 2016 (http://climateaction.la/wp-content/themes/larc/report/AGreaterLA_ClimateActionFramework_Dec-19-2016.pdf).

Program Management staff also provided a great deal of support to Resources Agency Safeguarding California Implementation, by acting as sector lead author for the Water Sector report, released in March, 2016 (and reported on in the Climate Change 2015 Annual Report): <http://resources.ca.gov/docs/climate/safeguarding/Water%20Sector%20Plan.pdf>. Additional support to Safeguarding was conducted by tracking DWR's Safeguarding related projects.

In addition, regional staff coordinated with DFM staff to highlight products and successes into the draft Safeguarding CA update for the Coastal Section as they relate to sea-level rise and coastal flooding issues. This was coordinated through the CO-CAT.

Additional Safeguarding California support was conducted by program managers in leading the Water Sector content development for the Safeguarding Update due out in 2017.

Annual Reporting Category before 2015

Planning, Modeling, and Data Collection

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O II: Tribal Engagement on Climate Change
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Managing Floodwaters while Protecting the Ecosystem
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life
Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Achieve the Co -Equal Goals for the Delta
Protect and Restore Important Ecosystems
Manage and Prepare for Dry Periods
Provide Safe Water for All Communities
Increase Flood Protection

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Diversify Local Supplies and Increase Water Use Efficiency
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each Reinforces Sustainable Development That is Resilient to Climate Changes
Protect and Restore Water Resources for Important Ecosystems
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure
EO S-13-08: NRC SLR Study
IRWM

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Research Partnerships: National Scientific and External Coordination Committees

Sponsor/Program Manager	Executive
Project Manager	Jeanine Jones / Michael L Anderson

Project Status:

On Going

Project Objective:

Represent DWR at interstate, national, and international levels on climate-related matters

Project Description:

Influence federal agency decisions regarding climate change programs, with a near-term focus on extreme events and improving sub-seasonal to seasonal (S2S) prediction of precipitation to support drought preparedness and long-term adaptation measures such as forecast-informed reservoir operations.

Project Deliverables/Timeline

Continue to influence federal agency decisions regarding climate change programs, with a near-term focus on extreme events and improving sub-seasonal to seasonal (S2S) prediction of precipitation to support drought preparedness and long-term adaptation measures such as forecast-informed reservoir operations. Continue working with WSWC and Western Governors Association on federal implementation of the National Integrated Drought Information System legislation. Work with NOAA and NASA to advance priority of research to improve S2S prediction, including holding science workshops and meetings. Wrote book chapter on California for CRC Press' "Water Policy & Planning in a Variable & Changing Climate".

Success Determination - Performance Metrics

Meetings Attended
Number of Agencies Engaged
Number of Partner Research Projects

Customers:

Other public agencies.

Funding Information:

Project Budget (Annual):	\$100,000	Funding Source:	General Fund
Budget Notes:	\$75,000 in one-time drought emergency funding, for a contract with Western States Water Council to engage NOAA and the research community on improving S2S precipitation forecasting		
Project Start Date:	Estimated 2010	Project End Date:	On Going

External Partners:

NOAA, NWS, USBR, USACE, USGS, NOAA RISAs, ASCE, USDA, WSWC, Scripps

2016 Project Accomplishments

In 2016, Jeanine Jones represented the Western States Water Council (WSWC) on a technical advisory committee to the federal Climate Change and Water Working Group (a coalition of multiple federal agencies including USBR, USACE, NOAA, and USGS). National scientific coordination with WSWC specific to improving S2S precipitation forecasting is covered under the S2S project report beginning in 2016. Michael Anderson sits on the steering committee of the NASA JPL Western Water Applications Office with meetings as requested by JPL. Attended kick-off meeting of steering committee and provided input on WWAO goals and objectives. Engaged USGS Water Science Center for California to review ongoing research projects related to watershed modeling and integrated water management decision support. Interacted with NOAA Earth System Research Laboratory at meetings and via email and phone to discuss research areas of mutual interest and opportunities to collaborate. Michael Anderson participated in the CIRES Cooperative Institute Program Review in 2016. CIRES is the Cooperative Institute that supports the NOAA Earth System Research Lab among other activities. Mike attends the monthly meetings of the Research Working Group of the State Climate Action Team and assists the Coastal Oceans Working Group as needed. Mike Anderson participates in the Bay Area Integrated Water Management Advanced Quantitative Precipitation Information Project which includes research elements from Colorado State and NOAA's Earth Systems Research Laboratory. Mike also engages with the National Interagency Drought Information System California Nevada projects which involve Western Region Climate Center and the California Nevada Applications RISA. Mike also follows the ongoing process of the Flood Frequency Guidance Update known as Bulletin 17C by the National Hydrologic Frequency Analysis Workgroup. Mike also participates in the bimonthly US Drought Monitor California Nevada Agency/Science Collaboration Call to coordinate input to the Drought Monitor. Mike Anderson also made multiple presentations to or with the UC Agriculture and Natural Resources Program related to drought and climate.

Annual Reporting Category before 2015

Grant making & Technical Assistance

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels

IWM Business Categories

Building Capacity for Regional Sustainability
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Manage and Prepare for Dry Periods
Increase Flood Protection

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Science Coordination: Research and Science Community Engagement

Sponsor/Program Manager	John Andrew
Project Manager	Elissa Lynn / Michael L Anderson

Project Status:

On Going

Project Objective:

In order to keep DWR up to date with the most recent and accurate climate science, as well as meet legislative mandates and direction for incorporating climate change in water management, the Climate Change Program conducts collaborative engagement with the academic and scientific community. See description and deliverables for the many projects that fall under this category; some have their own project reporting entry.

Project Description:

Various projects and research activities are undertaken to engage the science community so that DWR can be aware of and incorporate the latest climate science into its activities and planning.

Project Deliverables/Timeline**Past Deliverables:**

NRC Study
CCTAG (2007-09, and 2012-2015)* See report

Ongoing Deliverables:

Paleohydrology Studies* See report
Rain/Snow Trends in California * See report
Coastal Quick Guide (NOAA, TMM)* See report
Tribal Ecological Knowledge and Engagement* See Tribal
Science and Data Brochure
Atmospheric River research with Scripps* See report
Decision Scaling Analysis of Climate Change Impacts on SWP* See report
Extreme Event Modeling with UC Davis - reconstructing historical extreme precipitation events to determine how those extreme storms interact with west slope sierra watersheds to support better forecasting and response strategies.
Western Region Climate Center data support (see data and 2016 accomplishments)

Success Determination - Performance Metrics

To utilize, support and conduct research that meets standards for best-available climate science. Successful workgroup activities with partners, and outreach materials released.

Customers:

DWR

Funding Information:

Project Budget (Annual):	\$100,000	Funding Source:	Bond funds through FY 15-16
Budget Notes:	Approximate budget for staff time on efforts engaging the science community, and WRCC 2016 task order for \$51K. Individual projects listed in the deliverables may have their own budgets, as well.		
Project Start Date:	2007	Project End Date:	On going

External Partners:

State Climatologist, UC System, CCTAG, various State, federal and local science partners.

2016 Project Accomplishments

Commitment by the Climate Change Program to support Western Region Climate Center data with a \$51K task order, through UC/DFM contract 46-10378 Amendment 16, to update <http://www.wrcc.dri.edu/monitor/cal-mon/>.

Annual Reporting Category before 2015

N/A

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ III: Integrate Climate Change into DWR's Programs and Activities
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- ☐ V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
 Building Capacity for Regional Sustainability
 Taking Action to Reduce Residual Risk

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life
 Achieve the Co -Equal Goals for the Delta
 Manage and Prepare for Dry Periods

Safeguarding California Implementation Plan

Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
 Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
 Continue to Mainstream Climate Considerations into Water Management
 Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure
EO S-13-08: NRC SLR Study
EO S-13-08: Review and NRC SLR Study Every 2 Years
SGMA
IRWM
UWMP
California Water Code for California Water Plan

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Sea-Level Rise Case Study Booklet

Sponsor/Program Manager	Elissa Lynn, John Andrew
Project Manager	Lauma Jurkevics

Project Status:

Complete

Project Objective:

The goal is to improve outreach. Objectives included the following: (1) to provide examples others can use in adapting to changing sea-level rise; (2) to be a leader for locals in setting examples; and (3) to develop a downloadable case study booklet.

Project Description:

Local agencies, specifically those involved with Regional Water Management Groups, are seeking examples on where effective adaptive measures are being implemented to address climate change. Several guidance documents in various topic areas have been prepared for local agencies, which may not always have the funds or means to fully use or understand what will work for them. Therefore, providing examples of effective adaptation strategies that are currently in place or being used by a specific entity could provide others an easier approach in pursuing similar strategies for their own agencies.

The focus was to be on the state's guidance document for sea level rise and research and to describe examples and case studies where agencies are implementing this guidance. This project was to result in a downloadable case study booklet. However, after meeting with the CO-CAT and discussing this project with the DWR Interstate Manager, DWR staff found that keeping track of case studies would be onerous for one agency and that using existing websites to input these studies would be more desirable. After further discussion with the Climate Change Team, it was determined that no further work would be done on this project. Focus has now shifted on integrating sea-level-rise information with non-regulatory approaches to the National Flood Insurance Program. Details of this project can be found elsewhere.

Project Deliverables/Timeline

Downloadable case study booklet - it was later determined that the best use of resources was to utilize existing websites for inclusion of case studies, so no booklet will be developed.

Success Determination - Performance Metrics

n/a

Customers:

local coastal agencies

Funding Information:

Project Budget (Annual):	\$11,000	Funding Source:	Prop 84 (15/16), GF 16/17
Budget Notes:	SRO staff = \$11,000/yr		
Project Start Date:	2014	Project End Date:	2015

External Partners:

DWR's C4 and Matrix Teams, BDCP staff; members of the CO-CAT and OPC

2016 Project Accomplishments

Will be closed; determined that the best use of resources was to utilize existing websites for inclusion of case studies, so no booklet will be developed.

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels

IWM Business Categories

Building Capacity for Regional Sustainability
 Managing Floodwaters while Protecting the Ecosystem
 Taking Action to Reduce Residual Risk
 Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

Protect and Restore Important Ecosystems
 Increase Flood Protection

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
 Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
 Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
 Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each Reinforces Sustainable Development That is Resilient to Climate Changes
 Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO S-13-08: NRC SLR Study
 IRWM

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

State Government Regional Climate Change Coordination

Sponsor/Program Manager**Project Manager**

Michelle Selmon

Project Status:

Project Initiation Only

Project Objective:

Conduct quarterly or semiannual meetings in regions of the state to discuss CC efforts, projects and resources.

Project Description:

Climate Change adaptation and mitigation strategies can differ across different geographic regions. For example, coastal areas may have more concerns about sea level rise, whereas inland areas may be more concerned with extreme events, flooding, and water supply reliability. Discussion of Climate Change is frequently addressed in a top-down fashion in State Government. There is a need for more regional cooperation of CC strategies and knowledge.

The project's aim is to conduct regular (quarterly or semiannual) meetings in regions to discuss CC adaptation and mitigation efforts and regional and local challenges. Meetings will focus on: (1) Sharing information relating to climate change efforts in region; (2) Networking; and (3) CC-related presentations.

Project Deliverables/Timeline**Success Determination - Performance Metrics**

There is increased regional information sharing and collaboration on climate change mitigation and adaptation strategies and implementation projects.

Customers:

State government departments

Funding Information:

Project Budget (Total):		Funding Source:	
Budget Notes:			
Project Start Date:		Project End Date:	

External Partners:

IRWM, SIWM, O&M; F&W, Cal OES, Parks, CalEPA, RWRCB, UC and Cal State Universities, CALCC

2016 Project Accomplishments

This project was not moved forward in 2016. Newly formed state-level initiatives (e.g. ICARP) may meet the need identified with this project. Staff will participate in ICARP and other meetings to determine if this project is still necessary/useful for DWR Climate Program staff to lead.

Annual Reporting Category before 2015

N/A

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels

IWM Business Categories

Building Capacity for Regional Sustainability
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life
Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Identify Sustainable and Integrated Financing Opportunities

Safeguarding California Implementation Plan

Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management

Legislative and Gubernatorial Mandates

EO B-30-15: State Agencies Implement GHG reductions
SGMA
IRWM
UWMP

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Sub-seasonal to Seasonal (S2S) Forecasting

Sponsor/Program Manager	Jeanine Jones
Project Manager	Jeanine Jones / Michael L Anderson

Project Status:

On Going

Project Objective:

Improve the skill of S2S precipitation forecasting to support water management decision-making, for both near-term operational purposes and longer-term climate change adaptation

Project Description:

- 1.Working through Western States Water Council (WSWC), lead stakeholder coalition in supporting increased federal budget priority/funding for NOAA/NWS Climate Prediction Center operational S2S outlooks and related federal research funding
- 2.Develop and implement an outreach plan for raising awareness of the need for better S2S forecasts and potential applications for them
- 3.Develop and support research or projects to improve S2S forecasts specific to California
- 4.Work with CNRFC and CBRFC to operationalize experim

Project Deliverables/Timeline

- 1.Annually co-sponsor spring workshop with WSWC on S2S forecasting, and fall Winter Outlook Workshop specific to forecasts for California and the Colorado River Basin
- 2.Outreach publication and events, and scientific papers as appropriate
- 3.S2S research projects as subject to availability of funds
- 4.Annual meetings with CNRFC and CBRFC

Success Determination - Performance Metrics

NOAA estimates that improving its S2S outlooks requires sustained additional federal effort on the order of \$20M annually for a decade. This would be a desirable outcome metric, but is not one that DWR can control. DWR's output metrics are listed below.

- 1.Holding the annual workshops specified above
- 2.Holding at least one additional outreach event annually
- 3.Having at least one publication annually

Customers:

DWR programs, USBR Mid-Pacific Region, NOAA ACWA, water supply and flood management agencies generally

Funding Information:

Project Budget (Total):		Funding Source:	Varies; GF, Bond
Budget Notes:	Budget varies; Drought Emergency and Drought Programmatic (GF), Prop 1E		
Project Start Date:	2015	Project End Date:	ongoing

External Partners:

NOAA, NASA, WSWC, Association of California Water Agencies, Scripps, USBR, Sonoma County Water Agency

2016 Project Accomplishments

On behalf of WSWC, participated in congressional staff briefing on S2S budget needs, and developed related briefing materials. Held Winter Outlook Workshop. Initiated new contract with NASA using drought emergency funds, for assessment of weather models' ability to simulate Madden-Julian Oscillation and atmospheric river storms, and for making experimental forecasts.

Annual Reporting Category before 2015

N/A

Climate Change Objectives

O III: Integrate Climate Change into DWR's Programs and Activities
 O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
 O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
 Managing Floodwaters while Protecting the Ecosystem
 Taking Action to Reduce Residual Risk

State Water Project Related?

Yes

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
 Manage and Prepare for Dry Periods
 Increase Flood Protection

Safeguarding California Implementation Plan

Vigorously Prepare California for Flooding
 Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
 Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
 Continue to Mainstream Climate Considerations into Water Management
 Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Sustainability

Sponsor/Program Manager

Carl Torgersen

Project Manager

Mary Simmerer

Project Status:

On Going

Project Objective:

DWR will be a sustainability leader within State government and the California water community

Project Description:

DWR has established a Sustainability Policy, which received approval from former DWR Director Snow, on April, 22, 2009. DWR's Sustainability Policy embodies the goals and directions the Department will take to be a sustainability leader within State government and the California water community. The policy sets initial targets in the following areas:

- Carbon- 50% reduction below 1990 levels by 2020 (consistent with the AB 32 Scoping Plan); 80% reduction below 1990 levels by 2050 (EO S-0-05)
- Energy- Progressive acquisition of 360 GWh of renewable energy resources by 2020; reduce grid-based retail energy demand 20% by 2015; ensure Energy Star purchasing (EO S-2-04)
- Wastewater- Incorporate recycled wastewater and/or greywater into facilities if technically feasible and cost-effective
- Waste- 50% diversion from waste stream by 2020 (AB 1016)
- Water- 20% reduction in per employee water use by 2020 (consistent with SB 7x-7)

Project Deliverables/Timeline

- Carbon- 50% reduction below 1990 levels by 2020 (consistent with the AB 32 Scoping Plan); 80% reduction below 1990 levels by 2050 (EO S-0-05)
- Energy- Progressive acquisition of 360 GWh of renewable energy resources by 2020; reduce grid-based retail energy demand 20% by 2015; ensure Energy Star purchasing (EO S-2-04)
- Wastewater- Incorporate recycled wastewater and/or greywater into facilities if technically feasible and cost-effective
- Waste- 50% diversion from waste stream by 2020 (AB 1016)
- Water- 20% reduction in per employee water use by 2020 (consistent with SB 7x-7)

Success Determination - Performance Metrics

Customers:

DWR

Funding Information:

Project Budget (Annual):

\$324,366

Funding Source:

Executive Overhead

Budget Notes:

Project Start Date:	April 22, 2009	Project End Date:	In Progress
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External Partners:

None

2016 Project Accomplishments

For 2016, the document provided is the report for July 2015 – June 2016. Available at:

https://sustainability.water.ca.gov/library/-/document_library/view/3364357

Annual Reporting Category before 2015

Business Practices & Technical Expertise

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ III: Integrate Climate Change into DWR's Programs and Activities
- ☐ IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- ☐ VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Make Conservation a California Way of Life
Protect and Restore Important Ecosystems

Safeguarding California Implementation Plan

Support Regional Groundwater Management for Drought Resiliency
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Utilize Low-impact Development and Other Methods in State and Regional Stormwater Permits to Restore the Natural Hydrograph

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions
EO B-30-15: GHG Emissions Reduction 40% below 1990 levels by 2030, 80% below 1990 levels by 2050
EO B-30-15: State Agencies Implement GHG reductions
EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure
EO B-18-12: Reduce Agency GHG Emissions by 10% by 2015 and 20% by 2020 from 2010 Baseline
EO B-18-12: Zero Net Energy Buildings
EO B-18-12: Reduce Grid Based Energy Purchases for State Buildings by 20% by 2018 as Compared to 2003 Baseline
EO B-18-12: LEED Silver
EO B-18-12: Electric Vehicle Charging Stations

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Sustainable Facilities Operations - Greenhouse Gas (GHG) Initiatives

Sponsor/Program Manager

Executive

Project Manager

John Engstrom / Nathanael Frank

Project Status:

On Going

Project Objective:

Reduce GHG attributed to Business Operations

Project Description:

DWR will identify, measure, and implement sustainable facility operation practices to reduce GHG, and educate employees in these practices. The sustainable facilities operations practices will include reducing energy and resource consumption, while lowering greenhouse gas emissions and creating healthier working environments for DWR employees. The development of these enhanced business practices will include:

- DWR has integrated a document management system into its daily business operations. This type of system will reduce paper quantity and create an electronic system for tracking of approvals and electronic retention of documents to save time and resources.
- DWR will continue to promote the Environmentally Preferable Purchasing (EPP) program to utilize procurement methods that provide options for purchasing “green” products.
- DWR will increase its efforts to reduce, reuse, recycle, and rethink in all areas of DWR’s daily business activities. DWR will look at continuing to increase its waste reporting metrics under SB 1016 by using annual waste disposal as a factor when evaluating program implementation.
- DWR will continue to provide an official office supply reuse center (Green Pastures) on the 3rd floor of the Resources Building for new, gently used, or open box office materials that are available to all DWR employees free of charge.
- DWR will promote and implement energy, water efficiency, and conservation in all capital and renovation projects as well as operations and maintenance activities within budgetary constraints and programmatic requirements.
- DWR will promote ways to reduce employee business travel for meetings by use of technology such as teleconference centers or web casting. In addition, training webinars and other online training opportunities will be investigated to reduce training commute for employees.
- DWR will continue to promote the Payroll Deduction Transit Pass Program as part of its alternative commute program which subsidizes alternative transportation.

Other actions in progress or in planning to promote a more sustainable business include:

- DWR will continue to educate through outreach activities like the annual Green Week event, DWR News/People articles and Current announcements.
 - DWR is participating in the green building certification program LEED (Leadership in Energy and Environmental Design). The State Water Project Southern Field Headquarters is currently being submitted to LEED to become DWR’s first LEED Gold building.
- more

Project Deliverables/Timeline

Continuing GHG Reduction Measures

Success Determination - Performance Metrics

DWR has been monitoring retail water and energy accounts and recording the usage into Energy Star Portfolio Manager. Under Executive Order B-18-12, all State Agencies are required to reduce water use 10% by year 2015, and 20% by year 2020. From 2010-2016 DWR has reduced its water consumption by 42% (11,128 hcf). Between 2003 and 2016 DWR has reduced its energy usage by 3% (181,975 kwh).

Currently our Southern Field Division office is one of twelve LEED Certified State Buildings to receive a LEED Platinum rating for new construction. Platinum is the highest rating in the LEED green building rating system; it's one level higher than DWR's original goal of Gold. Building projects that have attained this rigorous level of certification are among the greenest in the world.

Customers:

DWR, and State Water Contractors

Funding Information:

Project Budget (Total):	\$170,000	Funding Source:	Multiple
Budget Notes:			
Project Start Date:	Continuous Efforts	Project End Date:	In Progress

External Partners:

Department of General Services

2016 Project Accomplishments

- May is Bike Month- DWR actively promotes commuting by bicycle. One of the efforts to increase this alternative mode of transportation is to encourage DWR staff to participate in the Sacramento's regional "May is Bike Month". DWR placed sixth in the region with employees logging 34,553 miles for the month of May in 2016.
- Bicycle Repair Station- DWR has installed a Dero Bike Fixit Station in front of the Resources Building. The stand is a vertical steel tube bolted to a concrete pad and two smaller tubes parallel to the ground mounted on top. A cyclist can hang his/her bike from the parallel tubes either by the saddle or the top tube. Several crescent wrenches, tire levers, screwdrivers, and Allen keys hang from steel cables inside of the tube and are easily accessible to the user. A durable bicycle pump, compatible with both Presta and Schrader valves, is attached to the side of the stand.
- Bike Share Program- DWR, through a Grant with Kaiser Permanente, now has 8 urban bicycles, along with a high-quality free-standing bike rack. Additionally, employees will have access to bicycle helmets, safety lights, sturdy bicycle locks, side bags (panniers), and adjustable seat post clamps. The program will help DWR reduce its environmental footprint by reducing vehicle trips, while also promoting worksite wellness, active transportation and environmental stewardship.
- Transit pass Payroll Deduction Program- This program permits purchase of a monthly transit pass using pre-tax funds from the employee's gross pay each month. When Purchasing with pre-tax funds, employees will save money for a monthly transit pass. DWR currently has 306 employees enrolled in the program.
- DWR's Purchasing Services Office will provide purchasing workshops to update the department buyers about the Environmentally Preferable Purchasing Practices (EPP) program and why it is in the best interest for the Department to utilize this opportunity. The purchases are reportable in many cases under the mandated goals outlined in the Public Contract Code (PCC) (12153-12320) for buying recycled-content products (RCPs). The goal of this effort is to increase purchases of RCP's.
- Dhaani Systems Energy Management Software- DWR is in the process of implementing this software to reduce desktop energy loads. This software continuously monitors individual computer usage patterns (by time of day, day of week, time of year) to minimize energy usage. As usage patterns and users change, Dhaani automatically adjusts each individual energy management profile WITHOUT the need for user or IT input. Energy savings automatically adjust to holiday seasons and other occasions when there are changes to schedules.
- Waste Reduction and Diversion Award- The recipient of this Diversion Award disposed the least amount of waste from 18 primary categories and six hazardous waste material categories. For 2016, DWR's O&M Fleet Management Division received this award for diverting 95% of the facilities waste totaling 370 tons.

- VDI (Virtual Desktop Infrastructure) Zero Client. This desktop-centric service has helped the department reduce energy usage by virtualizing all the components of the desktop.
- DWR currently has (7) zero emission dedicated electric vehicles, (12) non plug in hybrid vehicles and (11) plug in hybrid vehicles. In addition, DWR has installed 16 charging stations throughout the State (SFD Pearblossom-3 Chargers, OFD O&M Center- 4 Chargers, OFD Hyatt Pumping Plant- 4 Chargers, JOC- 2 Chargers (can charge four vehicles simultaneously), SJFD- 1 Charger (can charge two vehicles simultaneously), West Sacramento Industrial Building- 2 Chargers (can charge four vehicles simultaneously)). DWR is showing its commitment to sustainability by purchasing (10) additional plug in hybrids and (5) dedicated electric vehicles for 2017.
- DWR participated in Executive Order (EO) B-18-12, Green Building Initiative. DWR is monitoring retail water and energy accounts and recording the usage into Energy Star Portfolio Manager. All State Agencies are required to reduce water use 10% by year 2015, and 20% by year 2020. From 2010-2016 DWR has reduced its water consumption by 42% (11, 128 hcf). Between 2003 and 2016 DWR has reduced its energy usage by 3% (181,975 kwh).
- DWR is participating in the green building certification program LEED (Leadership in Energy and Environmental Design). The State Water Project Southern Field Headquarters was awarded DWR's first LEED Platinum building.
- DWR News/People- DWR has promoted sustainability through "DWR News/People" publication. Articles discuss accomplishments by DWR staff related sustainability at DWR. For 2016, DWR published the following articles in regards to sustainability: Designing to Save 3/18/2016, Saving Water and Energy Statewide 4/11/2016, New DWR Bike Share Program 4/29/2016, Pedaling Around Downtown 8/12/2016, Saving Water and Energy Statewide 4/11/2016,

Annual Reporting Category before 2015

Business Practices & Technical Expertise

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O III: Integrate Climate Change into DWR's Programs and Activities
- O VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Make Conservation a California Way of Life
Manage and Prepare for Dry Periods
Increase Operational and Regulatory Efficiency

Safeguarding California Implementation Plan

Utilize Low-impact Development and Other Methods in State and Regional Stormwater Permits to Restore the Natural Hydrograph

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions
EO B-30-15: GHG Emissions Reduction 40% below 1990 levels by 2030, 80% below 1990 levels by 2050
EO B-30-15: State Agencies Implement GHG reductions
EO B-18-12: Reduce Agency GHG Emissions by 10% by 2015 and 20% by 2020 from 2010 Baseline
EO B-18-12: Zero Net Energy Buildings
EO B-18-12: Reduce Grid Based Energy Purchases for State Buildings by 20% by 2018 as Compared to 2003 Baseline
EO B-18-12: LEED Silver
EO B-18-12: Electric Vehicle Charging Stations

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Sustainable Groundwater Management Act Implementation (climate change objectives)

Sponsor/Program Manager	Rich Jurich
Project Manager	Tyler Hatch / Andrew Schwarz

Project Status:

On Going

Project Objective:

To incorporate climate change by providing guidance and data for Groundwater Sustainability Plans.

Project Description:

DWR's initial role in SGMA is to provide regulations to revise basin boundaries, prioritize the alluvial groundwater basins, provide technical assistance, and evaluate groundwater sustainability plans (GSPs). Considering that SGMA requires that by year 2040 (or 2042, depending on the basin) applicable basins achieve their sustainability goals, DWR recognizes that climate change has the potential to exacerbate many ongoing issues with groundwater within the planning horizon. Climate change assessments will be a requirement and a key component of GSPs to assess future risk and to avoid undesirable results within defined basins under SGMA.

DWR will provide technical guidance and data including a climate change assessment of projected future conditions for individual SGMA groundwater sub-basins.

Project Deliverables/Timeline

Establish process and approach for determining the extent and magnitude of climate change and sea level rise impacts to sustainable groundwater management practices at the groundwater basin level.

Success Determination - Performance Metrics

Provide a spatially and temporally consistent suite of data products that provides Sustainable Groundwater Agencies with all major climate sensitive parameters needed to quantitatively model and analyze the expected change in water balance conditions under expected future climate changes and allows DWR to conduct a consistent and critical review of Sustainable Groundwater Management Plans.

Customers:

DWR SGMA Branch
Groundwater Sustainability Agencies (GSAs)

Funding Information:

Project Budget (Annual):	\$10,000	Funding Source:	General
Budget Notes:			
Project Start Date:	2015	Project End Date:	

External Partners:

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2016 Project Accomplishments

In 2016, several team meetings were held to discuss and plan for the development of datasets and analytical methods needed to conduct analysis of future water budgets and groundwater conditions. Through these meetings the team has tentatively agreed to start with the datasets and approaches developed for the Water Storage Investment Program (WSIP) and to refine and further develop methodologies to use these datasets and tools for use in groundwater analyses.

In 2017, the team will further refine methods and datasets as well as develop tools and resources for providing data to the GSAs.

Annual Reporting Category before 2015

Field Studies

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O III: Integrate Climate Change into DWR's Programs and Activities
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Taking Action to Reduce Residual Risk

State Water Project Related?

Yes

Governor's Water Action Plan

Make Conservation a California Way of Life
Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Manage and Prepare for Dry Periods
Expand Water Storage Capacity and Improve Groundwater Management
Provide Safe Water for All Communities

Safeguarding California Implementation Plan

Support Regional Groundwater Management for Drought Resiliency
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each Reinforces Sustainable Development That is Resilient to Climate Changes
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

SGMA

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Technical Assistance and Outreach for Integrated Regional Water Management (IRWM) Plans, Data Collection, and Other Climate-Related Tasks

Sponsor/Program Manager	John Andrew
Project Manager	Elissa Lynn

Project Status:

On Going

Project Objective:

The DWR Climate Change Program provides resources, technical assistance, and outreach to IRWM planning groups, water agencies, local governments, and other entities to incorporate climate change mitigation and adaptation into their planning efforts.

Project Description:

This project involves developing and identifying climate change resources, working on data collection and consolidation, and providing technical assistance and outreach within DWR and to IRWM planning groups, water agencies, local governments, and other entities to mitigate for and adapt to climate change. After the passage of Proposition 84, Water Code Section 10541 was updated to define the elements of guidelines developed for approving and distributing the funds. These elements included requiring IRWM plans to consider greenhouse gas (GHG) emissions of identified programs and projects and to evaluate the adaptability to climate change of water management systems in the region. As a result, DWR 2010 and 2012 guidelines for these Proposition 84 funds required IRWM Plans to address both adaptation to the effects of climate change and mitigation of GHG emissions. Although IRWM has been the initial focus of this project, the technical assistance, data collection, and outreach has expanded to target beyond those already associated with an established Regional Water Management Group (RWMG) working in IRWM.

Project Deliverables/Timeline

2015:

- Yuba County IRWM Vulnerability Assessment for Climate Change (Spring)
- Inyo-Mono RWMG presentation to CCTAG on results of evaluation of RWMGs use of Climate Change Handbook for Regional Water Planning (April)
- Inyo-Mono RWMG final report on results of evaluation of RWMGs use of Climate Change Handbook for Regional Water Planning (June)
- Climate Change Tools Table, IRWM Biennial Conference, San Diego (May)

2016:

- WCVC Climate Resilience Workshop (April)
- TB WCW Climate Change Impacts in the Tulare Basin Watershed Workshop (September)

Deliverables to be set each year based on needs determined by IRWM and Climate Change Program managers.

Success Determination - Performance Metrics

The Climate Change Program is able and accessible to meet the information requests of local and regional water managers, and those water managers are aware of who to contact and what information is available from DWR. Outreach and guidance can be difficult to measure, but success will be based upon awareness of water managers to turn to DWR, and upon DWR providing useful resources that are utilized, or providing information on where locals can turn.

Customers:

DWR, IRWM planning groups, water agencies, and local governments
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Funding Information:

Project Budget (Annual):	\$160,000	Funding Source:	Prop 84 (15/16), GF 16/17
Budget Notes:	SRO: \$35,000/yr SCRO: costs for work in Tulare Basin integrated into "Represent DWR in Interagency and Stakeholder Groups" task NCRO: \$6,400/yr NRO: \$116,480/yr		
Project Start Date:	January, 2010	Project End Date:	In Progress

External Partners:

Local RWMGs and other regional groups; DIRWM
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2016 Project Accomplishments

Much of the work in this task was done by regional staff, though coordination with headquarters staff occurred. Assistance throughout the year included distributing information at local IRWM stakeholder meetings.

Even though the Government Alliance Working Group of the Santa Ana Watershed Project Authority (SAWPA) has met in previous years, it did not meet in 2016. This group was originally formed as a pillar in the update of SAWPA's IRWM plan, One Water One Watershed (OWOW). There was interest in continuing to meet to share and network on issues affecting the region and to provide current resources, and regional staff had been actively involved. However, the leads from the Bureau of Reclamation and the U.S. Army Corps of Engineers did not hold a meeting in 2016. Meanwhile, SAWPA will be updating its OWOW plan in 2017 and will be forming a Climate Change pillar to provide input into the update.

Staff, though, continued to be involved in the stakeholder meetings of the Watersheds Coalition of Ventura County (WCVC), Upper Santa Clara River, Upper Santa Margarita Watershed, and the San Diego Regional Advisory Committee and participated in local discussions provided by the General Assembly for the South Bay Cities Council of Governments and Mojave Water Agency. With the WCVC, staff also assisted with developing a Climate Resilience Workshop for the IRWM membership group.

Most RWMGs finished their climate change work for their IRWM plans by 2013 with some in 2014 and one in 2015. Nevertheless, regional staff did review the IRWM plan for the XYZ (Pete, input) in 2016. Also, the Fremont Basin is developing its own IRWM plan. Staff met with this group and provided climate change information that DWR had developed.

Efforts connecting with RWMGs continued where staff is actively involved, such as the Tulare Basin Watershed Connections Workgroup (TB WCW), a collaborative of natural resource managers working together to advance watershed planning and resource management in the Tulare Basin. As a result, a Climate Change Impacts in the Tulare Basin Watershed Workshop was developed and presented in September.

Additional work involved outreach on the connections of climate change and water resources that occurred at workshops and conferences and with DWR staff, as well as with local, state, federal, and international entities, and included presentations in Chico, San Rafael, Sacramento, Glendale, San Diego, Ventura, Turlock, Atwater, Merced, Santa Clara, Sausalito, Tulare, Rocklin, Sonora, and San Jose throughout 2016. Overall, around 17 presentations were made on the work described in this task, though the geographic spread indicated new areas of outreach than in previous years.

Annual Reporting Category before 2015

Grantmaking & Technical Assistance

Climate Change Objectives

O I. Develop and Improve Communication, Outreach and Education on Climate Change
O III: Integrate Climate Change into DWR's Programs and Activities
O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

Manage and Prepare for Dry Periods

Safeguarding California Implementation Plan

Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each Reinforces Sustainable Development That is Resilient to Climate Changes
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
IRWM

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Tribal "Climate Conversations" video project

Sponsor/Program Manager	Kamyar Guivetchi, Anecita Agustinez, John Andrew
Project Manager	Elissa Lynn / Emily Alejandrino

Project Status:

On Going

Project Objective:

The purpose of this project is to better understand climate change and how it affects tribal communities. Tribes will have an opportunity to share their perspective on matters related to water and a changing climate. Selected interviews and location video will be edited into short segments for education purposes, similar to Tribal Water Stories collected for California Water Plan Update 2009. Climate Conversations will assist future development of tools and outreach materials to assist both DWR and Tribes in dealing with climate change.

Project Description:

DWR will interview tribes from various part of the state. After receiving appropriate permission, tribal practitioners will be taped on camera by DWR graphic services. Co-sponsors will assist by acting as liaison between DWR and Tribes, developing interview questions, and suggesting appropriate video to include. Selected interviews and location video will be edited into short segments for education purposes.

Project Deliverables/Timeline

* See Project Charter for more details*

http://dwrclimatechange.water.ca.gov/docs/Coordination/Climate_Conversations_Charter_Signed.pdf

Project Initiation and Approval from DWR Motion Picture & Graphic Services Completed.

Charter approval July 2016.

Commitment from academic liaisons August 2016.

Video shoots of interviews and locations fall/winter 2016/17.

Video release at Tribal Water Summit scheduled for spring 2018.

Success Determination - Performance Metrics

In 2017 film/interview three Tribes.

End of 2017 edit work with DWR film crew, CC Tribal sub-group and Tribes to assist with the content.

Premier final product at 2018 Tribal Water Summit.

Customers:

Tribal governments and communities. DWR Climate change tribal sub-group and DWR staff. Public for outreach and educational purposes. Government (state and federal) agencies.

Funding Information:

Project Budget (Total):	\$125,000	Funding Source:	Prop 84 Funds in 2015/16 and General Funds in 2016/17 and 17/18.
Budget Notes:	DWR Climate Change Staff Time \$50,000. DWR CC Staff Travel \$10,000. DWR Picture & Graphic Services Travel/Production \$25,000. Academic Liaison Contracts & Travel \$40,000 est.		
Project Start Date:	January 2016	Project End Date:	Spring 2018

External Partners:

Academic liaisons (UC and/or CSU system).

2016 Project Accomplishments

Project Charter developed and finalized.
Secured partnership with UC Davis.

Annual Reporting Category before 2015

N/A

Climate Change Objectives

- ☐ I. Develop and Improve Communication, Outreach and Education on Climate Change
- ☐ II: Tribal Engagement on Climate Change

IWM Business Categories

Building Capacity for Regional Sustainability

State Water Project Related?

No

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government

Safeguarding California Implementation Plan

Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources

Legislative and Gubernatorial Mandates

N/A

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Tribal Climate Change Coordination Subgroup

Sponsor/Program Manager

John Andrew, Elissa Lynn

Project Manager

Emily Alejandrino

Project Status:

On Going

Project Objective:

The group is comprised of DWR staff from different programs and classifications. The group objective is to identify potential projects to support tribal engagement on climate change issues related to water management in California. The project must also assist tribal communities in identifying areas where they may be vulnerable to the anticipated impacts of climate change and potential strategies for reducing those vulnerabilities. And serve as an educational piece to non-tribal communities.

Project Description:

The projects will serve one or more of the following purposes: 1) Determine or assess how climate change is and may impact tribal communities in the future; 2) Seek information from the Tribes on their conceptual framework for adapting and mitigating for climate change on a local and region scale; 3) Discover how traditional ecological knowledge is incorporated; and 4) Identify data gaps and opportunities for technical assistance which DWR could provide.

Project Deliverables/Timeline

- Subgroup charter was drafted in 2014, and signed on April 2015.
- The tribal communities vulnerabilities/adaptation matrix went final on June 2014. It is posted on DWR's Climate Change webpage.
- September 2014 partnered with CA-LCC to host a workshop for LCC agency staff on TEK at Sac State University.
- in 2015, Tribal diagram/poster went final and posted on DWR's Climate Change webpage
- 2016 Created a tribal module for Climate Literacy Training.
- Climate Conversations video project charter signed on 6/29/16. Working with UC Davis as a partner and aiming to do one or two video shoots by end of 2016.
- Other deliverables proposed by the group - TEK resources guide; create a Tribal page in the DWR Climate Change website; Flood and drought history with a tribal history overlay; develop a tribal youth program melding western science and TEK; host a climate change workshop for tribes; vulnerability, capacity assessment and adaptation planning pilot study; propose a climate change resolution for the Northern, Central and Southern Tribal Chairman's Association (out of scope); and vulnerability checklist for tribes.
- Tribal climate change workshop hosted and managed by Tribes. That is being doing with Graton Rancheria and Kashia Band of Pomo Indians with assistance from the CA-LCC.
-

Success Determination - Performance Metrics

Is the deliverable available online and for distribution to the public?

Customers:

California Native American Tribes, General Public, DWR staff

Funding Information:

Project Budget (Annual):	\$270,000	Funding Source:	Prop 84
Budget Notes:			
Project Start Date:	April 2013	Project End Date:	In Progress

External Partners:

California Native American Tribes, CA-LCC, UC Davis

2016 Project Accomplishments

- Sub-group held two meetings on 1/21/2016 and 3/1/2016.
- Project Charter for Climate Conversations signed June 2016.
- Through CA LCC Tribal Team, participated in planning for Inter-Tribal Climate Adaptation Leadership Summit held 1/16/2016 and 11/10/2016.

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O II: Tribal Engagement on Climate Change

IWM Business Categories

Ensuring Reliable Water Supply for All Californians

State Water Project Related?

No

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government

Safeguarding California Implementation Plan

Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources

Legislative and Gubernatorial Mandates

N/A

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Twitchell and Sherman Island Subsidence Reversal Projects

Sponsor/Program Manager	Bryan Brock
Project Manager	Bryan Brock / Samuel Miller

Project Status:

On Going

Project Objective:

DWR has developed several projects to demonstrate the potential for subsidence reversal and carbon sequestration. Sequestering atmospheric carbon via plant photosynthesis and net retention of carbon within the soil by decomposing plant matter will not only reverse subsidence in the western Delta, but also reduce the impacts caused by greenhouse gas (GHG) emissions. Over the past several years there have been four projects developed on Sherman and Twitchell Islands to demonstrate and mitigate subsidence and GHG:

- Wetland Research Facility – Twitchell Island
- Mayberry Farms Wetland Restoration Project - Sherman Island
- Farm Scale Rice Demonstration and Research Facility - Twitchell Island
- Twitchell East End Wetland Restoration Project – Twitchell Island
- Whale's Mouth Wetland Restoration Project – Sherman Island

The Department, working with research institutions and other State Agencies has developed a carbon protocol, which is being considered for adoption by the American Carbon Registry, eventually allowing the sale of carbon credits, and will provide an alternate means of producing income on existing agricultural lands. Through these demonstration projects, DWR will study the costs and benefits of these land use management practices to help define the potential value in a carbon market.

Project Description:

Wetland Research Facility – Twitchell Island

DWR constructed approximately 15 acres of wetlands in 1997 to evaluate land surface elevation changes and carbon accretion due to the accumulation and decay of plant materials. Two ponds were constructed and measurements are taken to determine the amount of accumulating organic matter and land surface elevation change. Ongoing research at this facility has shown that surface elevation changes due to accretion range from 3.2 to 5.6 cm/yr (1.3 - 2.2 in/yr), while surrounding areas used for agricultural purposes lost elevation due to subsidence. GHG monitoring is also being conducted and has shown

Mayberry Farms Wetland Restoration Project - Sherman Island

Mayberry Farms is a 307-acre, permanently flooded wetland completed October 2010. Building upon the successes shown at the Wetland Research Facility, we continue to monitor GHG flux to show benefits of newly established wetlands. Additionally, the Department has monitored methylmercury over the past 4 years, as required by the Regional Water Board, and data has shown that permanently flooded wetlands reduce the concentration of methylmercury in adjacent waterbodies. Data accumulated in this project will be used to develop a GHG protocol and will help establish flux rates in an emergent wetland system.

Farm-Scale Rice Demonstration and Research Facility – Twitchell Island

Similar to growing tules, rice is a wetland crop that the Department has investigated as a potential sustainable crop to reduce subsidence and facilitate carbon sequestration, while maintaining a farm economy. DWR commenced a pilot project in 2009 on an approximately 600-acre farm-scale demonstration rice field in the Delta. Key research components of this project included:

- Demonstrating the feasibility of growing rice in the Delta;
- Quantifying subsidence and carbon sequestration rates; and
- Determining water quality contaminant loading and exports.

While the research aspects of this project ended in 2014, farmers continue to grow rice on the site. Findings show that crop yields at this site are extremely low, making it hard for a farmer to justify this crop selection. GHG fluxes do show a marginal net sequestration rate, when compared other crops (corn, alfalfa, irrigated pasture, etc.); however, while continued subsidence did not occur, substantial accretion rates were not realized.

Twitchell East End Wetland Restoration Project – Twitchell Island

The Twitchell Island East End Wetland Restoration Project restored approximately 740 acres of palustrine emergent wetlands and approximately 50 acres of upland and riparian forest habitat on Twitchell Island. This property is owned by the Department of Water Resources and previously managed as flood irrigated corn and alfalfa.

Whale's Mouth Wetland Restoration Project – Sherman Island

The Whale's Mouth Wetland Restoration Project restored approximately 600 acres of palustrine emergent wetlands and approximately 150 acres of upland and riparian forest habitat on Sherman Island. This property is owned by the Department of Water Resources and previously managed as flood irrigated pasture.

Project Deliverables/Timeline

1. Substantial wetland restoration Development and Operation– ongoing
2. Adopted GHG Protocol by ACR - 2016
3. Continued monitoring of GHG benefits Delta-wide - ongoing

Success Determination - Performance Metrics

1. Final development and successful implementation of a GHG Protocol by ACR
2. Measurable accretion or evidence of subsidence being halted and/or reversed at wetland restoration sites.
3. Measurable and sustained carbon sequestration and net sink benefits at wetland restoration sites.

Customers:

1. Island residents, and all asset owners, including CalTrans, PGE, mineral right holders, and the Department of Water Resources.
2. The State Water Project and all water recipients that receive water that passes through the Delta.
3. All those that have potential impacts due to Climate Change including sea level rise and storm severity fluctuations (floods, drought, etc.)
4. Ecosystem beneficiaries including fisheries, waterfowl, endangered species (GGS and Swainson's Hawk)

Funding Information:

Project Budget (Total):	\$25,000,000	Funding Source:	Prop 84, 1E, Cap and Trade, and SWP
Budget Notes:			
Project Start Date:	1997	Project End Date:	In Progress

External Partners:

UC Berkeley, UC Davis, USGS, California DFW, Delta Conservancy

2016 Project Accomplishments

Initial flood up and maintenance activities completed at Whale's Mouth Wetland Restoration Project on Sherman Island. Topographic survey and planning activities occurred for a new approximate 1000 acre wetland on Sherman Island. Further refinements to Draft GHG Protocol as per American Carbon Registry Peer Review and Public Notice process.

Annual Reporting Category before 2015

Field Studies

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O III: Integrate Climate Change into DWR's Programs and Activities
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research
- O VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Managing Floodwaters while Protecting the Ecosystem
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Make Conservation a California Way of Life
Achieve the Co -Equal Goals for the Delta
Protect and Restore Important Ecosystems
Identify Sustainable and Integrated Financing Opportunities

Safeguarding California Implementation Plan

Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Continue to Mainstream Climate Considerations into Water Management
Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each Reinforces Sustainable Development That is Resilient to Climate Changes
Protect and Restore Water Resources for Important Ecosystems

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Video Production

Sponsor/Program Manager

Elissa Lynn

Project Manager

Elissa Lynn

Project Status:

On Going

Project Objective:

To provide public outreach on climate change impacts to California using video production.

Project Description:

Video production on climate change topics.

All videos produced are located on the publications page of the climate change program website, at:

http://www.water.ca.gov/climatechange/pub_video.cfm

Project Deliverables/Timeline

Deliverables prior to 2014:

"Science on a Sphere - Exhibit Tour" (2007) -

"Science on a Sphere - Exhibit Construction Time-Lapse" (2007)

"A Climate of Change" (2009) Host Elissa Lynn talks to an array of climate and water resource experts about the impacts of climate change already being felt in California and the adaptation strategies that will be needed to manage the state's water resources in the future. (Produced by DWR, in conjunction with the Water Education Foundation).

Future deliverables: Tribal Climate Conversations (See project entry)

Success Determination - Performance Metrics

Meeting deadlines and run time requirements, set by each project. Public dissemination of content.

Customers:

Public

Funding Information:

Project Budget (Annual):	\$10,000	Funding Source:	Various
Budget Notes:	Average cost per year. Public Affairs Video production team provides in-kind work on videos produced in DWR.		
Project Start Date:	2007	Project End Date:	Ongoing

External Partners:

DWR Motion Pictures and Public Affairs Office, CalWater researchers, Water Education Foundation, climate researchers, artists, Tribal members

2016 Project Accomplishments

No video production was completed this year, but planning was done for 2017 Tribal Video project, "Climate Conversations."

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

O I. Develop and Improve Communication, Outreach and Education on Climate Change
O II: Tribal Engagement on Climate Change

IWM Business Categories

Building Capacity for Regional Sustainability

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life
Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Manage and Prepare for Dry Periods

Safeguarding California Implementation Plan

Continue to Mainstream Climate Considerations into Water Management
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

N/A

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Water Storage Investment Program - Climate Change objectives

Sponsor/Program Manager	WSIP and CC program
Project Manager	Joseph Yun / Andrew Schwarz

Project Status:

On Going

Project Objective:

Develop an appropriate methodology and tools for the consideration of climate change in the Water Storage Investment Program funding application in compliance with Executive Order B-15-30

Project Description:

WSIP staff and CC Program working on behalf of the California Water Commission and in conjunction with stakeholders to develop methodology and tools for consideration of climate change in the WSIP application process.

Project Deliverables/Timeline

CC program consultation on methodologies and approaches. CC program assistance with presentation of climate change technical material to Commission and stakeholder groups.
Methodology and tools by August 2016

Success Determination - Performance Metrics

Provide a spatially and temporally consistent suite of data products that provides applicants with all major climate sensitive parameters needed to quantitatively model and analyze the impacts and benefits of future climate changes on proposed projects and allows the CWC to make informed investment decisions based on not just project performance under current climate conditions but also expected future climate conditions.

Determination: Success--Performance metric achieved.

Customers:

California Water Commission

Funding Information:

Project Budget (Total):	\$327,000	Funding Source:	Proposition 1
Budget Notes:			
Project Start Date:	January 2015	Project End Date:	December 16, 2016

External Partners:

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2016 Project Accomplishments

In 2016, DWR worked with California Water Commission Staff to form a working group composed of DWR climate change staff, DWR Statewide Infrastructure Investment Branch Staff, DWR Bay Delta Office staff, and consultants to develop a methodology for evaluating the impact of climate change on projects proposed under the Water Storage Investment Program. After extensive deliberation and analysis, a cutting edge methodology was developed that takes advantage of the latest science, including updated global climate models, updated downscaling methodologies, and improved statistical analysis. In November 2016, a complete set of climate analysis datasets were provided to the CWC and were posted to the CWC website for review and use by project applicants. The final regulations including regulations for conducting climate analysis for the application process and the datasets for use in that process gained final approval by the CWC on December 14th, 2016.

The regulations and datasets for climate change analysis for WISP are the most comprehensive and demanding climate change analysis ever required for a state investment or grant program and will likely establish a new standard by which other programs will be judged in the future.

It is not yet clear whether there will be additional work related to the climate change analysis component of WSIP required in 2017.

Annual Reporting Category before 2015

N/A

Climate Change Objectives

O III: Integrate Climate Change into DWR's Programs and Activities

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Taking Action to Reduce Residual Risk
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Achieve the Co -Equal Goals for the Delta
Protect and Restore Important Ecosystems
Manage and Prepare for Dry Periods
Expand Water Storage Capacity and Improve Groundwater Management

Safeguarding California Implementation Plan

Diversify Local Supplies and Increase Water Use Efficiency
Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Continue to Mainstream Climate Considerations into Water Management
Protect and Restore Water Resources for Important Ecosystems
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
EO B-30-15: Planning to Be Guided by Actions That Build Preparedness and Reduce GHG, Flexible and Adaptive Approaches, Protect Vulnerable Populations, Natural Infrastructure

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Water Use Efficiency Assistance

Sponsor/Program Manager	Diana Brooks
Project Manager	Kent Frame / Jim Lin

Project Status:

On Going

Project Objective:

(1) Implementing the Governor's EO B-37-16 – “Making Water Conservation a California Way of Life” issued on May 9, 2016. (2) Implementing Governor’s direction for Californians to reduce their water use by 20 percent relative to the 2013 water use during the record-set drought years (1/17/2014). (3) Continue to Implement Water Conservation Act of 2009 (SBX7-7).

Project Description:

In response to governor's EO B-37-16, DWR worked with the State Water Boards, CPUC, CDFA and CEC and developed the recommended water use targets for urban and Ag water suppliers, respectively. In response to Governor’s Draught Emergency Order, DWR WUE Branch has continued in implementation of two rebate programs in 2016: the toilet rebate and turf replacement rebate. The WUE Branch continued making progress in SBX 7-7 implementation in 2016. Most tasks were completed. In 2016 DWR WUE Branch mainly worked on two tasks in SBX7-7. (1) Task A3 - Update the Ag Efficient Water Management Practices (EWMP) Guidelines. (2) Task B3 - Statewide Targets for Regional Practices (recycled water, brackish water and groundwater, stormwater, etc.). See attachment for more information

Project Deliverables/Timeline

DWR in working with other four state agencies prepared an interagency report titled “Making Water Conservation a California Way of Life – Implementing EO B-37-16” in November 2016. The water use Targets recommended in the report will be put into use after the state regulators approved the report. Task A3 in SBX7-7: After the DWR and ASC (Ag. Stakeholder Committee) made the initial evaluation the existing EWMP Guidelines they concluded that there was no immediate need to update the Guidelines. Task B3 in SBX7-7: A comprehensive report covering the targets for recycled water, brackish water, groundwater recharge and stormwater will be completed by the end of 2017.

Success Determination - Performance Metrics

Water savings in million gallons, acre-foot (annually or in project lifetime);
Energy savings in KWh (for electricity) and therm (for fossil fuels) (annually or in project lifetime);
GHG emission reductions in MTCO2e (annually or in project lifetime).

Customers:

State legislature, Urban water suppliers and agricultural water suppliers, eligible NGOs, universities and research institutes

Funding Information:

Project Budget (Total):	\$100,200,000	Funding Source:	Prop 1, General Fund
Budget Notes:	\$50M and \$30M for desalination and Ag water uses, respectively, from Prop 1; \$15M for water use efficiency in Prop 1; and \$5.2M from implementation of EO B-37-16.		
Project Start Date:	U1 – Jan. 2010 U3 – Jan. 2010 U2 – Jan. 2010 U6 – Jan. 2010 A1 – Jan. 2010 A2 – Jan. 2010 A6 – Jan. 2010 A7 – Jan. 2010 B1 – Jan. 2010 B3 – Jan 2010	Project End Date:	U1 – early 2014 U2 – completed U3 – completed in 2014 U6 – completed A1 – completed A2 – completed A6 – completed in 2014 A7 – completed in 2014 B1 – task changed (ongoing)B3 – partly completed.

External Partners:

SWRCB, CEC, CPUC, CDFA, ARB

U1: CUWCC (California Urban Water Conservation Council)

U2: an Independent Technical Panel consisting of retail water suppliers, environmental organizations, business community, wholesale water suppliers, and academia;

U6: None;

A1: AWMC, stakeholders, and academics;

A2:None;

A6: SWRCB

A7:None;

B1: California Bay Delta Authority, California Dept. of Public Health, CPUC, and SWRCB;

B3: None.

2016 Project Accomplishments

Continuously provided technical assistance and response to the general public for the State Drought Emergency Contingency program and the state's Save Our Water program.

WUE Branch Awarded \$29.8 million grant money to 38 agencies on Ag Water Use Efficiency projects, and \$3.25 million to two agencies for the Urban Water Use Efficiency projects on CalConserve Resolve Loan program.

The WUE Branch CIMIS installed six new stations, received 14.3 million data queries from CIMIS users, and developed prototypes for the ETo Zones map and a CIMIS Mobile Application.

Annual Reporting Category before 2015

Business Practices & Technical Expertise

Climate Change Objectives

O I. Develop and Improve Communication, Outreach and Education on Climate Change

O III: Integrate Climate Change into DWR's Programs and Activities

O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels

O VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

No

Governor's Water Action Plan

Make Conservation a California Way of Life
Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Manage and Prepare for Dry Periods
Provide Safe Water for All Communities
Identify Sustainable and Integrated Financing Opportunities

Safeguarding California Implementation Plan

Support Regional Groundwater Management for Drought Resiliency
Diversify Local Supplies and Increase Water Use Efficiency
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Utilize Low-impact Development and Other Methods in State and Regional Stormwater Permits to Restore the Natural Hydrograph
Require Closer Collaboration and Coordination of Land Use and Water Planning Activities to Ensure that Each Reinforces Sustainable Development That is Resilient to Climate Changes

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions
EO B-30-15: GHG Emissions Reduction 40% below 1990 levels by 2030, 80% below 1990 levels by 2050
EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
UWMP
California Water Code for California Water Plan

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Water-Energy Subgroup of the Governor's Climate Action Team ("WETCAT")

Sponsor/Program Manager	John Andrew
Project Manager	Qinqin Liu

Project Status:

On Going

Project Objective:

Coordinate state-level water-energy planning in support of AB 32

Project Description:

DWR is a principal agency in the Water-Energy Subgroup—known as the "WETCAT"—of the Governor's Climate Action Team. DWR coordinated Water-Energy policy and management actions with other principal WETCAT agencies including State Water Resources Control Board, California Energy Commission, and the California Public Utilities Commission. The WETCAT coordinates and focuses its efforts on GHG emission reduction actions related to the transport, treatment, delivery and use of water for environmental, agricultural, residential, commercial, institutional, and industrial needs.

DWR has worked with other principal WETCAT agencies to complete final AB 32 Scoping Plan update to address water and energy efficiency issues. DWR continues to play lead roles using integrated water management for water conservation, and water and energy use efficiency as well as water recycling.

Project Deliverables/Timeline

DWR have refined white paper connecting water, energy and food for climate change and collected related reference information by Dec. 2016, and completed the final white paper in Feb. 2017. Peer reviewed paper has been published including conceptual framework in Sept. 2016. DWR has provided reviews and recommendations for 2030 scoping plan update according to ARB time line in 2016. DWR has coordinated with ARB and other WETCAT agencies 1) to complete final water-energy grant program guideline by Sept 2016 with proposal time line in Nov. 2016; 2) provided reviews and recommendations for water-energy grant proposals in Dec 2016 and Jan. 2017.

Success Determination - Performance Metrics

Coordinated with interagency team at WETCAT meeting each month, provided DWR water management update and distributed peer reviewed publication to all members, provided recommendations for the future WETCAT plan, and reviewed AB32 scoping plan documents in water and green building related to water-energy.

Customers:

DWR, CEC, CPUC, SWRCB, CARB, CDFA, CALEPA, NRA and public, NGO and local agencies

Funding Information:

Project Budget (Annual):	\$10,000	Funding Source:	ARB
Budget Notes:	cost is \$10,000 for the staff time in 2016 meetings and tasks		
Project Start Date:	2006	Project End Date:	In Progress

External Partners:

State Water Resources Control Board, California Energy Commission, the California Public Utilities Commission, Other State agencies.

2016 Project Accomplishments

DWR continued to be a key player to coordinate science and policy with other WETCAT principal agencies and to share water-energy data and information. DWR completed white paper to connect water, energy and food as well as ecosystem process issues with climate change implication, including WETCAT actions. DWR has coordinated with ARB and other WETCAT agencies 1) to complete final water-energy grant program guideline by Sept 2016 with proposal time line in Nov. 2016; 2) provided reviews and recommendations for water-energy grant proposals in Dec 2016 and Jan. 2017; 3) provided reviews and recommendations for 2030 scoping plan update in water and other related sectors

Annual Reporting Category before 2015

Energy & Greenhouse Gas Emissions

Climate Change Objectives

- O I. Develop and Improve Communication, Outreach and Education on Climate Change
- O III: Integrate Climate Change into DWR's Programs and Activities
- O IV: Advance the Integration of Climate Change at the Local, Regional, State, National and International Levels
- O V: Manage, Analyze, and Disseminate Climate Data, Conduct Climate Change Research
- O VI: Promote the Mitigation of GHGs in the Water Sector

IWM Business Categories

Ensuring Reliable Water Supply for All Californians
Building Capacity for Regional Sustainability
Planning Priorities and Investments for a Sustainable Future

State Water Project Related?

Yes

Governor's Water Action Plan

Make Conservation a California Way of Life
Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Achieve the Co ~~Goals~~ for the Delta
Protect and Restore Important Ecosystems
Manage and Prepare for Dry Periods
Expand Water Storage Capacity and Improve Groundwater Management
Increase Operational and Regulatory Efficiency

Safeguarding California Implementation Plan

Support Regional Groundwater Management for Drought Resiliency
Diversify Local Supplies and Increase Water Use Efficiency
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Better Understand Climate Risks to California Water and Develop Tools to Support Efforts to Prepare for Climate Risks

Legislative and Gubernatorial Mandates

AB32: Reduce GHG Emissions
EO B-30-15: GHG Emissions Reduction 40% below 1990 levels by 2030, 80% below 1990 levels by 2050
EO B-30-15: State Agencies Implement GHG reductions
EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
EO B-18-12: Reduce Agency GHG Emissions by 10% by 2015 and 20% by 2020 from 2010 Baseline
EO B-18-12: Zero Net Energy Buildings
IRWM
UWMP

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Website Updates

Sponsor/Program Manager	John Andrew
Project Manager	Michelle Selmon / Emily Alejandrino

Project Status:

On Going

Project Objective:

The goal is to provide a useful, user-friendly website for water managers and the public.

Project Description:

Manage where status of the Dashboard (LifeRay site), external climate change site, and internal climate change site. Respond to staff request on website changes. Maintain communication with Division of Technology Services/Collaboration Services Section staff on the use and maintenance of the website. Have Francisco Guzman be back-up for high importance requests.

Project Deliverables/Timeline

Working with program staff and IT to consolidate dashboard and internal site to SharePoint. Work with IT to transfer external site to the new webpage template. Timeline is on-going.

Success Determination - Performance Metrics

Continue working with staff for website to have current content.
By mid- 2016 draft a new look to the climate change pages.
End of 2016 transfer content to new website template.

Customers:

DWR staff and public.

Funding Information:

Project Budget (Annual):	\$8,320	Funding Source:	
Budget Notes:			
Project Start Date:	On Going	Project End Date:	On Going

External Partners:

None

2016 Project Accomplishments

Send Aqua Assist tickets to IT on behalf of program staff for changes to the external site. Made changes to the internal site such as updating the climate literacy materials. Upload documents to the dashboard in preparation for upcoming climate literacy classes.

Annual Reporting Category before 2015

Public Outreach

Climate Change Objectives

O I. Develop and Improve Communication, Outreach and Education on Climate Change

IWM Business Categories

Building Capacity for Regional Sustainability

State Water Project Related?

No

Governor's Water Action Plan

Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
Manage and Prepare for Dry Periods

Safeguarding California Implementation Plan

Reduce Sacramento-San Joaquin River Delta Climate Change Vulnerability
Prepare California for Hotter and Drier Conditions and Improve Water Storage Capacity
Address Water-related Impacts of Climate Change on Vulnerable and Disadvantaged Populations and Cultural Resources
Continue to Mainstream Climate Considerations into Water Management
Protect and Restore Water Resources for Important Ecosystems
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Legislative and Gubernatorial Mandates

EO B-30-15: Take Climate Change into Account in Planning and Investment Decisions, Full Life-cycle Cost Accounting
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